

Arts + Social Impact Explorer Fact Sheet

ARTS + SCIENCE

OVERVIEW

Arts and science benefit each other. Artistic practice hones skills, teaches innovation, patience, and creativity, and sparks new ways of thinking about and navigating scientific problems.

The arts also help explain complex concepts to the general public, drive increases in confidence among learning scientists, and help illuminate analytical challenges in creative ways.

The arts are not opposite of science--the two are closely linked, and are responsible for major breakthroughs and broader understanding of the world.

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IMPACT POINTS

105% RETENTION OF SCIENCE CONTENT THROUGH THE ARTS

Research shows that students exposed to scientific concepts through artmaking retain it more and for longer--even months later!¹

A SCIENTIST IS MORE LIKELY TO BE A NOBEL LAUREATE IF THEY ALSO ARE ARTISTS.

Compared with other researchers, proportionately more Nobel prizewinners and members of the US National Academies pursued interests such as arts, theatre, or creative writing.⁴

40% OF SCIENTISTS HAVE COLLABORATED WITH AN ARTIST--AND MORE THAN 95% OF THOSE SAY THEY'LL DO IT AGAIN.

A poll conducted by the scientific journal Nature found that 40% of the researchers surveyed have collaborated with artists, and nearly all of them said they would consider doing so in the future again.²

ARTS AND CRAFTS HELP TRAIN SCIENTISTS TO BE MORE EFFECTIVE AND CONFIDENT IN THE LAB.

Research shows that chemistry students who are trained on how to cook are more likely to be confident in their abilities in chemistry.⁵

THE ARTS CAN MAKE COMPLEX CONCEPTS ACCESSIBLE.

Researchers have found that artist-created visualizations of complex scientific concepts not only help the general public better understand--the help the scientists themselves understand the meaning of the data and devise next steps.³

HUMANS PROCESS VISUALS 15 TIMES FASTER THAN TEXT-- IN AS LITTLE AS 13 MILLISECONDS!

The way complex concepts like climate change and sustainability of the environment are presented is crucial in convincing people of the urgency. Using the arts can drastically increase comprehension.⁶



EXAMPLES OF PRACTICE

Configuration Spaces of Rigid Origami



Configuration Spaces of Rigid Origami explores the intersection between origami, the ancient Japanese art of paper folding, and mathematics to predict how materials fold.

https://www.nsf.gov/awardsearch/showAward?AWD_ID=1906202&HistoricalAwards=false
kshankar@nsf.gov

image: An origami model constructed of multiple phizz units.

Glukupikron: Public Art to Illustrate Science

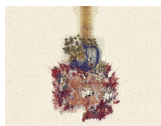


Students in the 2016 iteration of the National Science Foundation's Community Engagement in Science Through Art program created a steel sculpture titled 'Glukupikron' meaning "sweet-bitter". The structure is an abstraction of an imaginary molecule that combines glucose (sugar) and phenylthiocarbamide (a bitter tasting molecule). Through this piece, the students were playing with the idea that chemistry is life and life is bittersweet. The piece also featured an interactive augmented reality component in which visitors could direct a smart device (smart phone, ipad, etc) at the hole in the structure to receive chemistry fact, poetry, and prose that relates to the concept of bittersweet chemistry.

<http://cestaprogram.com/2016-program.html>

image: A photo of the Glukupikron sculpture at its unveiling.

The Sound Digestive System



Sound Digestive System is an audio visual project that uses the digestive system processes into algorithmic sound composition.

<http://www.realitat.com/MAT/sounddigestivesystem/info@mat.ucsb.edu>

image: The Sound Digestive System with nine food particles being digested at different intervals.

National Science Foundation's Community Engagement in Science through Art Summer Program



The Community Engagement in Science Through Art (CESTA) program is a one-month summer program for students to collaborate on an art installation piece, drawing on their different backgrounds in sculpture, engineering and chemistry. These teams of students must overcome the technical jargon of their own disciplines to collaborate in creating an interactive art piece for their local campus community. The project aims to train students in communication and collaboration skills, making both science and art more visible to the public.

<http://cestaprogram.com/index.html>

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image: CESTA students install sculpture "Object D4h" in the Evansdale Library at West Virginia University.

The Mathanaeum



The Mathanaeum is an interactive exhibit at the National Museum of Mathematics that presents math in a visual, artistic and creative manner, allowing visitors of all ages to apply a pallet of operations to transform basic mathematical shapes into unique three-dimensional digital sculptures.

<https://momath.org/>

info@momath.org

image: The Math Square, an interactive exhibit at the Mathanaeum.

top image: The Structure Studio art and science space at the Mathanaeum.

REFERENCES

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READING LIST

The Integration of the Humanities and Arts with Sciences, Engineering, and Medicine in Higher Education



In its 2018 report *The Integration of the Humanities and Arts with Sciences, Engineering, and Medicine in Higher Education:*

Branches from the Same Tree, an ad hoc committee of the National Academies of Sciences, Engineering, and Medicine pointed to an emerging body of evidence suggesting that integration of the arts, humanities, and STEMM fields - science, technology, engineering, mathematics, and medicine - is associated with positive learning outcomes that may help students enter the workforce, live enriched lives, and become active and informed members of a modern democracy.

<https://www.nationalacademies.org/our-work/the-integration-of-the-humanities-and-arts-with-sciences-engineering-and-medicine-in-higher-education>

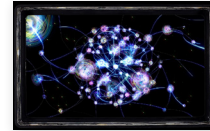
Living in Data: A Citizen's Guide to a Better Information Future



Written by self-described “data artist” Jer Thorp, this book explores the ways arts and science intersect, the hidden perils of data in a modern world, and the ways humans can bring humanity back to analysis.

<https://us.macmillan.com/books/9780374720513/livingindata>

Illuminating the Crossroads

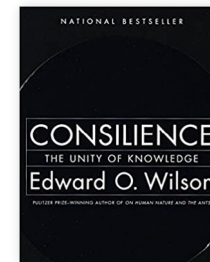


Illuminating the Crossroads strives to show how science and art come together to speak a common language. Science is the quest to understand the physical world

around us. Art is the desire to express the mental world within us. This curated online gallery within Google Arts & Culture explores where arts and science intersect in meaningful ways.

<https://artsandculture.google.com/usergallery/illuminating-the-crossroads-perspectives-on-the-intersection-of-art-and-science/yAKiH6Q8DyyHIQ>

Consilience by E.O. Wilson



In *Consilience*, Edward O. Wilson renews the Enlightenment’s search for a unified theory of knowledge in disciplines that range from physics to biology, the social sciences and the humanities. Using the natural sciences as his model, Wilson forges dramatic links between fields; he explores the chemistry of the

mind and the genetic bases of culture. He postulates the biological principles underlying works of art from cave-drawings to *Lolita*. Ultimately, *Consilience* links science and art in the footsteps of Newton, Einstein, and Richard Feynman.

https://www.amazon.com/gp/product/067976867X/ref=as_li_qf_asin_il_tl?ie=UTF8&tag=quillette-20&creative=9325&linkCode=as2&creativeASIN=067976867X&linkId=64cc71ac876e0e20b02b092da7744437



ORGANIZATIONS

Leonardo: The International Society for Arts, Science, and Technology

Fearlessly pioneering since 1968, Leonardo serves as THE community forging a transdisciplinary network to convene, research, collaborate, and disseminate best practices at the nexus of arts, science and technology worldwide.

<https://www.leonardo.info/about>

American Academy of Arts & Sciences

Founded in 1780, the American Academy of Arts and Sciences honors excellence and convenes leaders from every field of human endeavor to examine new ideas, address issues of importance to the nation and the world, and work together to cultivate the arts and sciences.

<https://www.amacad.org/>

Fast Company

Fast Company is a monthly American business magazine published in print and online that focuses on technology, business, and design. It publishes eight print issues per year.

<https://www.fastcompany.com/>

Society for Literature, Science, and the Arts

The Society for Literature, Science, and the Arts welcomes colleagues in the sciences, engineering, technology, computer science, medicine, the social sciences, the humanities, the arts, and independent scholars and artists. SLSA members share an interest in problems of science and representation, and in the cultural and social dimensions of science, technology, and medicine.

<https://litsciarts.org/>

DC Arts Science Evening Rendezvous / Cultural Programs of the National Academies of Science

The DC Art Science Evening Rendezvous (DASER) is a monthly discussion forum on art and science projects in the national capital region and beyond. DASERs provide the public with a snapshot of the cultural environment of the region and foster interdisciplinary networking.

<http://www.cpnas.org/events/experience-future-events-daser.html>

top image: The Sound Digestive System with nine food particles being digested at different intervals.

THANK YOU TO OUR SPONSORS



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Americans for the Arts developed this Fact Sheet as part of the Arts + Social Impact Explorer.

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