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## The Importance of Being Creative

Dennis Callahan

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# The Importance of Being Creative

## **Abstract**

Dennis Callahan is a graduate student in Materials Science at Caltech and also is an advisor to The STEAM Journal. He has created many types of scientific art, and his images have twice consecutively won first place at Caltech's "Art of Science" competition.

## **Author/Artist Bio**

Dennis Callahan is a graduate student in Materials Science at Caltech. His thesis is focused on exploring design limits for novel types of solar cells to achieve maximum efficiency with minimum cost and use of raw materials. He has created many types of scientific art, and his images have twice consecutively won first place at Caltech's "Art of Science" competition. In his spare time Dennis is an amateur photographer and singer-songwriter. He also experiments with generative art, which is an art form at the intersection of abstract drawing and computer programming in which artistic works are created with a computer through the use of human designed algorithms. One of his major interests and passions is the merging of science and art to help foster a greater widespread understanding of the purpose and importance of each of these typically distinct and 'under-appreciated' topics. [www.its.caltech.edu/~callahan/Home.html](http://www.its.caltech.edu/~callahan/Home.html)

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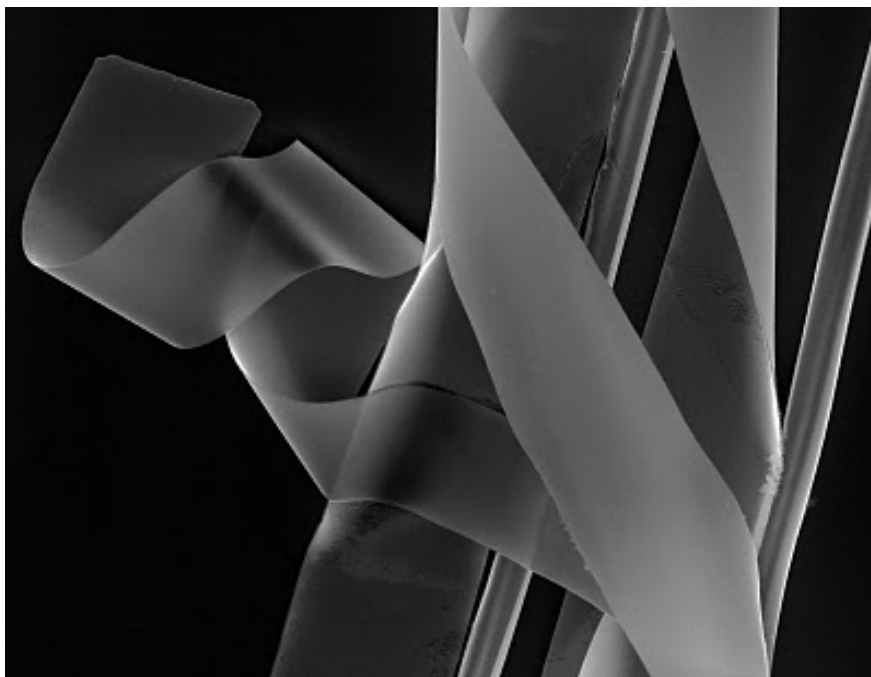


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## The Importance of Being Creative

*Dennis Callahan*

There are many reasons to integrate the Arts into Science, Technology, Engineering and Mathematics education policy, but perhaps the greatest is how it fuels creativity. As a scientist, I have found that the most important attribute in scientists that I admire (and scientists that seem to have the greatest impact) is creativity. It is not enough to just master mathematic techniques and memorize scientific facts from books and journal articles. To be a great scientist, it seems, one must also be greatly creative.



These thin films of gold (Au) were patterned into rectangles and engineered to roll up into tubes due to thermal stress built in to the films during deposition. In the following cases they failed to roll into tubes as desired, but instead rolled into other various nano-sculptures.

Knowing complex mathematics matters less than it used to, as computers do most of the computation work in modern science and technological research these days. Having a great memory and knowing lots of scientific facts also no longer matters as much either, as anyone can look up almost any fact or scientific study they need to on their computer or smart phone within minutes.

As computers continue to get better at assisting us in these things, creativity may be the only thing that eventually sets us apart from artificial intelligence. For this reason, it seems that the value of human inventiveness and creativity will only increase.

This is not to imply that knowing these things is no longer important (especially if one is a scientist), only that as time goes on it seems that creativity will matter more and more and will inevitably become the most desired characteristic in a scientist.

Exposure to and appreciation of the arts seems crucial to build creativity and inventiveness. Without that, all that one can learn about science, technology, engineering and mathematics would mean so much less than it otherwise could.