



A little science...A touch of fiction...A lot of adventure...

News from the Den

Hello and welcome to our newsletter. Is it already December? Where did this year go? Weirdness in 2020 and 2021 could be blamed on COVID, but this year? Maybe time is speeding past for CA because she is deep into research about time - quantum time, relativistic time, Newtonian time. She's trying to mold time into a tool Lauren and Alex can use. Stay tuned for *Quantum Time* coming out in the new year. Still no news on *The Paris Contagion* reviews. All appendages remain crossed.

Quick update from the Den then its on to all things science - we didn't know what to pick this month there has been so much news and so many happenings. And then when we thought we had it all laid out - the National Ignition Facility at Lawrence Livermore Labs announces a net energy gain! Where to put all this amazing stuff? We'll do our best.

On other news, CA was asked place one of her books at Shepherd's - a wonderful site for discovering the best books related to an author's books as recommended by the authors. Skip over to Shepherd to check out [CA's contribution](#).

We've added a new feature to the letter - we'll start inserting searchable links on the topics we highlight if you want to go in-depth.

We wish you and yours the happiest of holidays and blessings for the New Year. Be well friends and thanks for your continued interest in CA's work.

Latest and Greatest - Science News

Its all about biology - ancient and modern

Is it inorganic rock structures or is it a record of some of the oldest life on Earth? Microscopic structures found in the 3.48 billion year old Dresser formation in western Australia have been determined to be stromatolites. Photosynthesizing microbes thrived in a shallow lagoonal setting warmed by hydrothermal vents and grew in 'wrinkly and crinkly' mats, columns and domes. Now they appear as iron-oxidized layers of silica-rock. Researchers speculate that life on Mars would occur in a similar environment and appear as layered iron-oxidized rocks. [Read further](#).

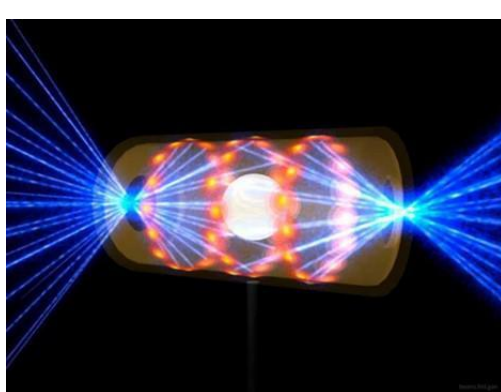
Does stress impact us physically? An epigenetic study completed on children born during the Great Depression (1929-1939) show signs of accelerated aging. The researchers evaluated chemical markers attached to the 800 participants DNA-their epigenome. These markers determine when, where and by how much genes are expressed in cells. The 800 people in the study have older cells than they should as shown in their epigenome. Indications that the stress and starvation their mothers experienced during their earliest stages of fetal development shaped their future health. What are the implications of this study today? With the US Supreme Courts revocation of Roe v. Wade, people now exposed to socioeconomic hardships of unwanted pregnancies could create long-term health consequences in the children. "What we experience in the first nine months may affect us our entire lives," Dr. Lauren Schmitz, UW-Madison. Check out this article, [How the Great Depression Shaped People's DNA](#), from Nature.

In the Nexus Series, CRISPR gene-editing is used to develop a treatment for the Comin bioweapon. Now, CRISPR has been used to alter T-cells and create 'bespoke' immune cells to attack tumors. These personalized treatments were targeted against solid tumors of the breast and colon. Genetic mutations found within the tumor were used to design proteins called T-cell receptors unique to each person's tumor. Then CRISPR was used to insert the receptors into the person's T-cells creating an immune response to fight and destroy the tumor. See the [full article](#) and for basic CRISPR info, see [this article](#) from NewScientist.

No one can escape COVID. Virologists and veterinarians at the University of Glasgow have determined more than 350,000 cats across Britain contracted the SARS-CoV-2 virus. This is approximately 3% of the feline population. Though only one case of cat-to-human infection is documented, this study has implications for feline health in general and may create an animal-human interface for new mutations of the virus. Cats are highly susceptible to other retro-viruses-feline HIV and leukemia primarily. Read the story, [Covid Infected 'More than 350,000 Pet Cats' in Britain](#), from the Telegraph.

Photo of the Month - Net Energy Gain

This artist's rendition show the 192 laser beams entering a hohlraum-gold capsule and collapsing the fuel pellet (hydrogen ions) to a tiny sphere. The beams compress the hydrogen ions and heat the target to millions of degrees Celsius for nuclear fusion to occur. Nuclear fusion is what drives the sun and produces the solar radiation we feel on Earth. For the first time the energy needed to create the reaction (2.05 megajoules) was surpassed by the energy produced - 3.15 megajoules. The equivalent of 3 sticks of TNT. This breakthrough indicates plentiful, carbon-free energy without radioactive fission byproducts may be possible in the next several decades. Read more about the [fusion breakthrough](#) from Science.



Lawrence Livermore National Laboratory/AP

In Memoriam - Marilyn Fogel, Ph.D.

Pioneering astrobiologist, biogeochemist and 'isotope queen' lost her battle with ALS in May, 2022. Her research interest covered a variable treasure trove of subjects from Earth history and terrestrial ecosystems to detecting life on other planetary bodies, all growing from her revolutionary work in isotope geochemistry. See NASA's [feature story](#) on Marilyn.

Historical Foundations - How far can Mathematics go?

Julia Robinson, Ph.D. would celebrate her 100th birthday this month. Every year on 8 December her wish was to know the answer to Hilbert's 10th problem and determine what mathematicians can and can't know. As the first female elected to the mathematics section of the National Academy of Sciences, past president of the American Mathematics Society and the recipient of a MacArthur Fellowship, she was not granted an official faculty position until 1975. After 21 years of combined effort from Martin Davis, Yuri Matiyasevich, Hilary Putnam and Julia Robinson, we now know the 10th problem has a negative answer, the algorithm proposed by Hilbert does not exist.

Book of the Month - Alan Turing: The Enigma by Alan Hodges

Given Julia Robinson's work with the 10th problem I thought you might like to read about Alan Turing, whose Turing machine was used to determine that the 10th problem's conjecture was wrong. Alan Turing had an idea about a 'universal machine'. A machine built at Bletchley Park, and used to crack the German Enigma ciphers during World War II. His universal machine laid the foundations for modern computing. The world lost a genius when Turing took his own life at 41. His suicide was due to a society's criminalization of homosexuality. We still live in this world. A world of labeling, bullying, division, and derision, enabled by social media built on the platforms designed from his computer foundations. Perhaps remembering this man and his contributions would be a starting point for change.

Minutiae

We'll carry on with *Quantum Time*. Lauren and Alex have lots of adventures to share and hurdles to top in the coming second Arc of the Nexus Series.

Thanks for subscribing. Have the best of holiday seasons. Be kind.



keep being curious

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