

## **Navigating the Future in a Sea of CRISPR Uncertainty: Contemplating Map Essentials**

**June 23, 2019**

### **Who do we trust?**

#### ***Opening Words***

Adapted from “Drawn Together” by Jennifer Leota Gray

We come together this week  
Bound not by a single creed,  
Or a desire to please a single vision of God.  
Yet we are drawn together  
By a belief, that how we are in the world,  
Who we are together,  
*Matters.*

We gather this morning,  
together in the knowledge  
that love and trust, can change this world.

We are just beginning a week long journey together. Some of us know this place and each other from previous IRAS events and conferences, others, like myself, may be experiencing Star Island and an IRAS conference for the first time. All of us have agreed to participate in an experience that will challenge us to engage a topic from a multidisciplinary perspective, one that welcomes scientific and religious understanding.

As I learned more about our specific topic for the week, Bioengineering, Gene Editing, and the Human Future, in the context of the new technological possibilities offered by CRISPR, one word bounced repeatedly through my thoughts- “Uncertainty.” It seems to me that a large part of what we will be trying to do on our shared journey this week is grapple with the reality of uncertainty. How can we

prepare ourselves to wrestle with uncertainty, moving responsibly towards hopeful possibilities? “Navigating the Future in a Sea of CRISPR Uncertainty: Contemplating Map Essentials,” is, I hope, a fitting theme for a group of courageous souls who have agreed to spend a week together on an island in deep engagement with a very timely topic, and who will ultimately take their hard won insights back to the mainland and put them to good use.

So what essentials should we consider over the next six days? I believe they revolve around these questions-

1. Who do we trust?
2. How do we define humanity?
3. How do we imagine the future?
4. Who gets a voice in the imagining?
5. When is it time to act?
6. Is it a journey worth celebrating?

Today we will start with the question that I believe grounds all the other ones- “Who do we trust?” or put another way, “What knowledge will we use in drawing our Map?”. I’m guessing this crowd, attracted to, and I assume building on, the insights of IRAS founders, would be willing to draw a very unique map.

Now I’m about to state the obvious, and in the interest of full disclosure, I will admit that *I want to hear myself say these words in this place. I respect what we are learning about the world through science and I respect the insights of religious traditions;* given your attendance at an IRAS conference, we probably have that in common. In this sense we are generous with our trust, but not blind. A positive view

of science does not mean we are confident in its ability to alone insure a positive outcome for all, but neither are we confident in any religious sensibility that would easily dismiss realities about the natural world revealed by science. Historians of science and religion remind us that since the sixteenth century the two fields have largely gone their own ways with little integration. Recognizing that this theme is to the peril of humankind (earthkind too) and working to do something about it, in my opinion that is sacred work and IRAS can be proud of the role it has played and continues to play in this work. *We are on an island standing on the shoulders of giants.* Our presence here suggests that what we trust most is neither science or religion per say, but what may come out of an open exchange between the two.

Left to their own ends both can give us plenty of reason to be cynical. Have you been following the legal battles and company startup stories surrounding CRISPR?-if so then you have one example of what I mean. Let me recap that soap opera for you. You know that CRISPR is a powerful genome editing tool, this means that large quantities of dollars are at stake for the scientists, institutions and companies claiming patent or licensing rights for this tool. Not soon after the first landmark paper by Emmanuelle Charpentier and Jennifer Doudna was published in 2012, showing how CRISP could be used as a gene editing tool, Charpentier set out to create a company. Initially she tried to include other CRISPR researchers, who just six months after the original landmark paper, had published another paper showing the application of CRISPR in human cells. Prior to any of Charpentier's efforts at company building, Jennifer Doudna, in 2011, had already started a company to market the use of CRISPR as a research tool.

In her book with colleague Samuel Sternberg titled “ A Crack in Creation” that describes both the discovery of CRISPR, and her own concerns about the ethics of its use, Jennifer Doudna says this about those early days:

“It was a heady time. I was elated that the work published with Emmanuelle the preceding summer had inspired others to pursue a line of experimentation similar to our own. Only later would the contents and publication dates of these papers be dissected to support arguments on a dispute over CRISPR patent rights, *a disheartening twist* to what had begun as collegial interactions and genuine shared excitement about the implications of the research. (p.96)”

What happened with Charpentier’s attempt at a unifying the researchers under a new company? -No luck, the attempt at group unity collapsed under the weight of predictable human foibles –egos and greed, and not just of individual researchers but also of their institutions. At the end of this saga, multiple companies were formed and billions of dollars invested in them. And a good chunk of those dollars went toward lawyers’ bills as they fought each other over patents.

Now we have multiple companies, with a broad range of applications, both human and non-human, and scientists with interests in more than one company. Emmanuelle Charpentier and Jennifer Doudna, the two women who published that first landmark paper showing the gene editing potential of CRISPR, they now work with and helped to found separate companies. But at the same time they were fighting together with UC Berkeley for patent rights against the Broad Institute and the Harvard scientists who published the first paper showing application of CRISPR

in human cells. To the best of my knowledge where things stand now is that both the UC Berkley group and the Broad group have patents, the bottom line being that using CRISPR will mean obtaining licenses from multiple parties. Confused yet? Here is the takeaway from a reporter for Synbiobeta, a network of those interested in synthetic biology:

“There was a brief period in which it seemed that the core of early CRISPR scientists would be able to partner and share intellectual property. But disagreements over academic credit, company locations, loyalty, ego, financial gain and even Nobel Prize aspirations splintered the CRISPR pioneers”

The temptations of fame and fortune are not unique to the field of science, but they do tarnish its portrayal as an earnest search for knowledge about the natural world and ultimately a trustworthy source of that knowledge. A similar fear is voiced by a colleague of Jennifer Doudna’s, Michal Eisen, in a 2017 February blog about the patent saga entitled “Patents are destroying the soul of academic science.” This sentence sums it up nicely, “ The flurry of CRISPR activity beginning in 2012 has become as much a patent gold rush as a journey of discovery.”

What particularly resonated with me is his accusation that in the battle for patents the scientific process was being misrepresented. He notes that public statements by Doudna about “experiencing frustrations in applying CRISPR to eukaryotic cells “ and “it was not known whether such a bacterial system would function in eukaryotic cells,” statements that are reflective of the scientific process in general, and ones a careful scientist speaking honestly about CRISPR would, and

should use, these statements were being distorted to amplify the accomplishments of one group over another in order to win a patent. While he clearly sides with his own institution over another in this case, he also admits to expect no better of his own institution if they saw an opportunity to distort the truth for profitable gain. The broader question he poses is whether or not academic science has been transformed from “an engine of discovery into a source of institutional and personal riches.”

Regardless of how the patents and intellectual credits have been, and will continue to be sorted out, we are left with the reality that science has discovered a powerful tool to edit the DNA of organisms, but in the process the scientist involved lost trust in one another. Now what? In the epilogue to her book Doudna reflects on competition, collaboration and aspirations:

“These twin poles of science-competition and collaboration-have defined my career and shaped me as a person. Over the past half decade in particular, I have experienced the gamut of human relationships, from deep friendships to disturbing betrayals. These encounters taught me about myself and showed me that humans must choose whether they will control or be controlled by their own aspirations. (p.243)”

*If aspirations are destroying the soul of science then how do we repair it and how do we protect against aspirations out of control?* If religious insights can be a source of ethical guidance then we hope that an open exchange with religion will be helpful. We know however that this exchange brings its own challenges, including which or whose religious insights get priority. For example, who wouldn't want to ease

human suffering, a potential offered by CRISPR? But how to proceed when developing applications for CRISPR involves testing with human embryos, or fetal tissue, and there are varying religious ideas about the ethics of such testing. *Even when we agree to seek a check on ego and greed, soul repair and protection is messy.*

*Who do we trust? - Science, religion or an open exchange between the two? I put my trust in the open exchange, with a generous amount of grace thrown in.* Whether you interpret grace as “the courteous goodwill we can extend to one another” or “the free and unmerited love and mercy given to us by God” we need it for the soul work we are going to be doing together this week. Thankfully, we are in a good place, here on Star Island, to trust one another and see where grace leads us. I’ll end with that thought, for a Unitarian Universalist I am getting a bit uncomfortably close to giving a shout out to original sin.

### ***Closing Words***

Adapted from “A Prayer for the Faithifiers” by Hilary Allen

Spirit of life,  
Keep watch on the innovators, the trailblazers, the takers of risk.

Invite us to be persons of vision and integrity.  
Help us to remember the mystery from which possibility is born.  
Lead us to honor this sacred place and our time together where ministries, idealists,  
and realists meet.

Encourage us to imagine more than just what is.  
Fill our hearts in times of discouragement.  
Keep our eyes on the long now.

Through our efforts, let us know the fruits of connection and trust.

So let it be, amen.