

FEATURE // BY BRIAN DRAYTON

# Tracing the INVISIBLE FABRIC of Everyday Science

*When it comes to science, policy documents and public attitude polling suggest a paradox: Americans think science is important and fascinating, but Americans don't know much science, and we are resistant or even hostile to science research in certain areas.*

These are areas where the implementation of science-based policy is seen as having an ethical or moral component. The list is familiar —vaccination, climate change, GMOs, water quality, or chemical safety standards.

Public understanding and attitudes towards such topics are fragmented and contentious. As a result, the development and implementation of policies to protect health and wellbeing are hampered or prevented. Attempts to create consensus around such topics are challenged not only by a lack of science knowledge but by ignorance about how communities negotiate and assign values and meaning to science topics in their everyday lives.

So where and how are values relating to science negotiated? At the core, *conversation* is the mechanism and the setting that establishes and maintains community norms. Conversation creates the “common sense” of a community. In conversation we pass on information that supports our thinking or that rules out some alternatives. This information comes wrapped up with emotions, with attitudes and framing, and with implied or explicit valuation. Underlying these conversations is the nature of our community — who we talk with, how we are related, and how we influence one another.

The networks of relationship and conversation within a community can be thought of as an *invisible fabric*—one that holds, shapes, and expresses the content, value, and consequences of science, the meaning of science for its members. With an internal TERC grant, I am exploring how this invisible fabric functions within interest groups such as clubs, religious congregations, business associations, and local governmental bodies, and the roles they play in the creation of meaning about science that matters to them.

## WHO DO THEY TALK WITH ABOUT SCIENCE?

In this exploratory phase, I've asked individuals to describe their group — who is part of it, how they meet each other, what activities they participate in. This then lays the groundwork for understanding their social network, and for learning how that group is in living exchange with others.

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*leaving one area in your gardens wild, so wild organisms have a place to go. There was a talk about mason bees as important pollinators ... We are people who like to get our hands dirty ... We don't usually do anything scientific ... Well, actually I guess we do, but it's just not called that. Those things I just mentioned are scientific.*

It's no surprise that my interviewees “talk shop” with their peers about the details of their shared interests. Farmers talk about the weather, equipment, livestock, soils or crops; gardeners talk about soils, cultivars, pests, or bed design; hunters talk about the landscape, the movements of game, or stalking techniques. Everyone shares anecdotes and mishaps. A birdwatcher said:



*... [B]asically if you're in a particular place at a particular time, like Monhegan Island in May, everybody who puts on a pair of binoculars is “part of the community.”*

realized his circle was much wider and included conventional farmers, extension agents, and farmers at a distance who shared a common interest. For the manager of a nature reserve, his network includes colleagues, board members and advisors, and scientists and volunteers. The president of a regional garden club talks with other members, but also with horticultural professionals in the area, including sometimes university faculty.

Not surprisingly, each person belongs to many communities, and each participant has their own links outward to other talking groups. We are all embedded in a sea of science ideas and information—but our personal contacts often focus and stimulate our thinking and feeling.

### SCIENCE BY ANOTHER NAME

When I ask, “What science is relevant to your group's interests?” most interviewees have to think a bit before they can answer. As a science educator, I see topics such as new flower cultivars, the length and quality of the maple sugaring season, and the decline of shrimp fishing in the Gulf of Maine are obviously “science.” But from inside these interest groups, things look different — these aren't necessarily labeled “science” in their minds at all. The garden club president told me about various speaker presentations at the club:



*[A farmer came and] talked about conservancy, animal care ... field rotations. ... [A] speaker who judges flower shows [gave a] talk about invasive species—made us aware of what to pull up, the technique of*

### CREDIBILITY FROM EXPERIENCE

In all of these exchanges, an important kind of evaluation is going on: who to listen to about what topics. As the organic farmer said,



*Depending on how you feel about the person who is giving you the information, they have certain credibility ... in most cases, you give more credence to what those active farmers are experiencing and understanding about whatever it is, certain varieties of grass, certain land management practices, health issues with animals. Those [contacts] are very powerful.*

### DO CONTROVERSIAL OR EMERGENT SCIENCE TOPICS COME UP?

In the interviews, I listen to hear if any controversial or novel science subject has been the topic of debate within an interest group. If not, at the end I ask whether climate change

comes up, to learn more about how these groups negotiate values around controversial topics. In response, the garden club president gave a complex answer:



*Climate change came up once. Politics comes into play with this. People tend to not take climate change seriously here, as opposed to the west coast.*

*I feel like that people don't get it, that that's what's happening ... [but] I don't talk unless someone asks. They are very sensitive to judgments about lifestyle choices. That's a real big factor for climate change, too.*

I asked the nature center manager, "I'm curious how your group makes decisions relating to science. Do you ever have disagreements that need to be resolved?" He replied,



*Sometimes. ... We're careful about if we approach somebody to do a lecture, if it's going to be something that's going to bring people in, it's going to be close to what's going on in the area. Like I said, the big focus [recently] was deer. The deer population is a big deal now down that way*

*... I'm really concerned about the whole climate change and melting-type thing ... I don't think people either are aware—one person thinks it's a hoax ... I don't know what it's going to take for people to finally realize that we need to do something about it. ... I think if things continue in the park, I think if the deforestation continues, I think we will do events where people actually can see what's going on with deer population, how it affects other animal populations. As things get worse in that regard, I think we will, because the forest will eventually just—the forest as they know it, will disappear.*

When the issues are translated into the terms of current concerns, this enables people to engage with them but in terms of the values relating to their focal interest. The organic farmer translated "climate change" into "drought and deluges, the whole extreme events thing ... When you have stock, the big issue is water and grazing." The beekeeper said,



*As a beekeeper, I have to pay attention to the flowers that the bees rely on. I probably have a hundred different species of plants, trees, and shrubs that*

*I keep track of, and there are years where there are tremendous changes, especially in the last few years. In 2009 or 2010, all the blooms were really, really early. More than two or three weeks earlier than usual, and I think it's a pattern that's repeating itself. It's not something that's really talked about much.*

## OBSERVATIONS SO FAR

These initial field notes support the idea that science topics do get evaluated within interest groups, but are not always seen as "science." Rather, they are seen as questions of art, craft, or professional practice, and evaluated in those terms. This relates to the hypothesis underlying this emerging line of work, that attitudes (and eventually actions) about controversial science topics are forged in conversation within communities of interest. In conversation, we can observe the processes by which "facts" are turned into consequential knowledge, evaluated in the light of community values, and given meaning by the process of negotiation in trusted settings.

Next this project will focus on three different communities of interest to identify and describe the social structures they use to create consequential science knowledge on a contentious science topic, and analyze the processes by which they make their own meaning about the science.

Looking ahead, we hope to design an experiment to test our understanding of these communities' ways of working, phrasing a science controversy in the language of their interests and concerns and tracing the paths by which meaning is made and integrated into the invisible fabric.

