During his leadership of the Pew initiative, Fernandez and his colleagues partnered with the U.S. Food and Drug Administration and the U.S. Department of Agriculture in small workshops to discuss biotechnology in animal agriculture. The center may look for similar opportunities to share its findings, he said. “I find that kind of participatory and interactive event to be a good way of helping to inform a policy-maker audience. Reports can be enormously influential, but I think that you can’t underestimate the value of face-to-face interactions.”

The center may also use interactive media and multimedia to communicate its narratives, he said. “From my work in the private sector, we saw how social media and other kinds of communication tools have really changed the landscape in the policy-making arena, and I think that we will absolutely need to understand how to leverage those tools to reach a broader audience.”

One of the biggest challenges “is to be as unbiased and neutral as possible” and to avoid any notion that the center is advocating for scientists as “just another special interest group,” said Fernandez. Positioning the center as a source of trustworthy information, he said, is important in light of “the erosion of trust in science and scientific evidence in policy-making broadly, which is particularly critical at a moment in time when so many of the issues that we’re addressing have a strong scientific and evidence-based component to them.”

While there are some decision-makers who willfully disregard or undermine scientific evidence, Fernandez said, “I think there’s lots of reasons evidence is underappreciated, underevaluated, underutilized in policymaking that are not just people ignoring it.” Some policymakers may not fully consider the evidence because it’s not being presented or provided in a way that is compelling or relevant to them and their districts and their constituents, he said.

“There is a real hunger for this kind of thing among the community,” he said. “As long as we can establish ourselves in a way that will be taken seriously and trusted, we will have an opportunity to do something that will make a difference.”

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## Golden Goose prize recognizes serendipitous discoveries

Roots of the immune system, cell communication, and implicit bias are honored in the 2018 awards

**By Becky Ham**

A chance encounter with a gland located in the rear end of a goose was the start of something big for Bruce Glick, a lifelong bird watcher who turned his interests toward poultry science after serving in World War II. Glick was curious about the purpose of the gland, known since the early 17th century as the bursa of Fabricius, named after Italian anatomist Hieronymus Fabricius.

“Good question,” said George Jaap, his Ph.D. adviser at Ohio State University, when Glick asked about the bursa. “You find the answer.”

The answer came when Glick and fellow graduate student Timothy Chang discovered by accident that geese missing their bursa glands were unable to produce antibodies. As the experiments piled up over the years, it became clear that Glick had uncovered the fundamental division of labor between B and T cells in the immune system. The finding underlies much of what scientists know about diseases from leukemia to AIDS and has transformed the production of vaccines and monoclonal antibody drugs to treat arthritis, multiple sclerosis, and several cancers.

Fittingly for a man with a lifelong love of birds, the late researcher was honored with one of three 2018 Golden Goose Awards, presented each year by science and higher education organizations led by the American Association for the Advancement of Science and a bipartisan group of congressional supporters. The award, established in 2012, recognizes scientists whose federally funded work may have been considered odd or obscure at first but has resulted in significant benefits to society.

AAAS has a long tradition of supporting federal funding of basic research. Long before the Golden Goose award, President Dwight D. Eisenhower underscored the necessity at a 1959 New York City symposium held by AAAS and the National Academy of Sciences.

“Government’s role in research and its responsibility for advancing science must be large and there must be persistent partnership between government effort and private effort,” said Eisenhower at the event. “Our science and technology are the cornerstone of American security, American welfare, and our program for a just peace. For the government to neglect this would be folly.”

Glick, who was on the faculty at Mississippi State University and Clemson University, is “one of these amazing agricultural scientists who toil away and no one recognizes what they’ve done,” said Sonny Ramaswamy, president of the Northwest Commission on Colleges and Universities, who nominated Glick for the award. “But his work, in multiple disciplines, has really been the kind of seminal
discoveries and inventions that are the lore of textbooks.”

Birds—chickens this time—played another key role in recipient Stanley Cohen’s discovery of cytokines, cell secretions that affect the behavior of neighboring cells and are often called the “vocabulary” of cell communication. Cohen, a professor emeritus at Rutgers New Jersey Medical School, was studying the immune cell lymphocytes to learn how they help to protect the body against infectious diseases like tuberculosis. Serendipity struck again, in the form of a batch of chicken eggs that Cohen had infected with a virus as part of a failed attempt to show that the virus could suppress immune responses. Before tossing them out, Cohen decided to examine them further, finding some of the small proteins that he would later name cytokines.

Scientists since have identified more than 100 cytokines across every organ system with diverse roles in growth, development, immune defense, and cancer. Cytokines are also at the base of a thriving group of therapeutics for cancer, inflammatory, and autoimmune diseases. As of 2011, more than 120 companies were developing more than 270 therapies that involve cytokines, according to the Cambridge Healthtech Institute Pharma Reports.

Cohen’s first papers on cytokines were rejected by journals, but he persevered with funding from the U.S. National Institutes of Health. “The way to approach failure is to look carefully at what went wrong to see if there are any clues that might lead to something interesting that was unexpected,” he said. “Ultimately, though, what keeps any scientist going is the thrill of discovery. There are lots of unanswered questions out there.”

Harvard professor Mahzarin Banaji and her colleagues Brian Nosek at the University of Virginia and Anthony Greenwald at the University of Washington were recognized for their role in developing the concept of implicit bias, the idea that people unconsciously carry cultural beliefs and attitudes that influence whether we perceive different groups of people as “good” or “bad.” Banaji and her colleagues have collected data on implicit bias through the Implicit Association Test website (https://implicit.harvard.edu), the results of which have led to widespread changes in hiring practices, law enforcement and physician training, and even politics. During the 2016 U.S. election, the concept of implicit bias with regard to racism and policing featured prominently in the presidential and vice-presidential debates.

Banaji said the results have been disturbing to some in the scientific and broader community since the beginning. “We knew one thing from the history of our field: that good people often are capable of surprisingly bad behavior,” she said. “To us, our research was providing a new and more dramatic view of ourselves as fallible, and there was no option but to pursue it, no matter what anybody else thought.”

Like previous Golden Goose recipients, she stressed that federal funding for her studies was a vital part of expanding an early idea into a concept with widespread social impact. She mourned the recent reduction of basic research funding of social cognition studies through the National Institute of Mental Health. “We will never know about the many great discoveries that could have been made with small amounts of funding to people very much like the ones who are being honored today,” she said.
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