Lessons for philanthropy

A whole greater than the sum of its parts

What philanthropy can learn from complex systems theory

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Introduction

Is philanthropy less than the sum of its parts? We know of countless examples of individual organizational excellence: nonprofits and foundations that achieve extraordinary impact on the great challenges of our time. But it is hard to avoid the haunting sense that all this good work does not add up. The efforts of individual organizations are fragmented and isolated. This fragmentation yields real challenges: inefficient fundraising, infrequent collaboration, and uneven learning. All told, it is difficult to articulate the impact of the *whole* of philanthropy.

So how can we reconcile individual excellence with our sense of collective underperformance? And how might we act to counter it? How might we help philanthropy be greater than the sum of its parts?

Over the last few decades a new science has emerged that wrestles with the questions of systems-level behavior. Researchers across physics, biology, chemistry, computer science, sociology, and economics have sought to understand how systems work. Their explorations have included many overlapping and intersecting sub-fields, from network analysis to chaos theory. Here I will speak of this field in broad terms as *complex systems science*.

The philanthropic community can learn much from this work. This paper is an initial effort to connect the insights from complex systems science with nonprofits, foundations, and all those devoted to making a better world.

Is philanthropy a system?

Marketplaces are not just a collection of transactions. They are a swarm of interpersonal interaction between people. Real people with opinions and beliefs, who haggle with each other and trade "market information" as much or more than they trade products and services. There once was a time when financial markets were physical locations. Where people knew each other by sight and gathered to engage in trade. Today, financial markets are virtual, but no less human.

Philanthropy is making this same transition as we head full tilt towards a fast-moving global stream of social investments benefiting high-impact social enterprises with both nonprofit and for-profit status. This transition does not just require data; it requires conversation.

— SEAN STANNARD STOCKTON, ENSEMBLE CAPITAL MANAGEMENT

Is philanthropy even a system? Some thoughtful commentators have argued it is not. Katherine Fulton and Andrew Blau, then of the Monitor Institute, said:

Philanthropy itself is not a system. Individual institutions and givers in philanthropy are not in any sense reliant on one another; they exist independently and can act without much reference to what others do. Thus, there is no system where actors must respond to one another, adapt to one another, or learn from one another.[1]

Their comment is no compliment. It is rooted in justified frustrations with the providers of financial capital for good. And they may well be right. In this case the authors define *philanthropy* as the set of institutional funders. But let us zoom out and consider all *private action for public good,* including nonprofit organizations, intermediaries, foundations, and social enterprises. All of these entities exist, to go back to the original meaning of the word *philanthropy,* for the love of mankind. Given this broad definition, is philanthropy a system?

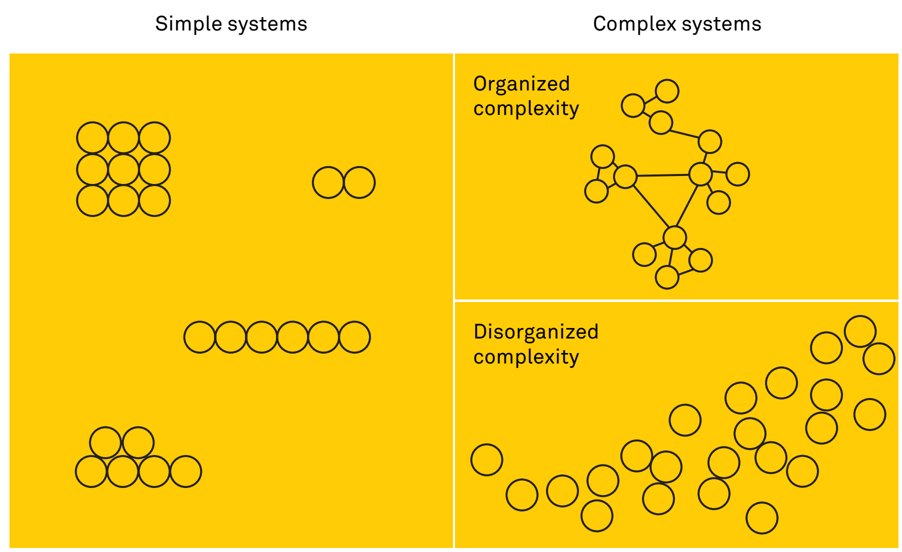
In this essay, I will attempt to show that (1) philanthropy is in fact a system, but (2) it does not exhibit the behaviors of a high-functioning system, and (3) there are strategies that can help philanthropy become a higher-functioning system.

With insight from complex systems science, we can think clearly about how we—members of the community for a better world—might become greater than the sum of our parts.

A crash course in complex systems science

To begin, let us define *system*. In simple terms, a system is *a set of components interacting within a boundary*. We experience systems throughout our lives: the parts of a car engine; an ant colony; a pack of dogs in a park. So how might we understand how systems work?

In 1948, Warren Weaver, a mathematician based (notably, given the topic of this paper) at the Rockefeller Foundation, wrote a paper called "Science and Complexity." He offered a basic categorization of systems. Two billiard balls colliding on a table is a simple system; we can use basic Newtonian mechanics to understand their motion.[2] A thousand billiard balls thrown into an empty swimming pool represent disorganized complexity; their motion could be analyzed by the tools of statistical mechanics. Indeed, science is able to make statements about the collective behavior of such a system because the variance among individual elements tends to average out. In disorganized complexity, the whole is not greater than the sum of its parts. It is, in a word, chaos. As those balls settle in the bottom of the empty pool they reach a static equilibrium.



In contrast, there are systems that exhibit organized complexity. The behavior at the level of the group is fundamentally different from the behavior at the level of the individual. A single water molecule does not freeze or boil or exhibit surface tension—it is only a *collection* of water molecules that exhibits those properties. This higher-level order is called an emergent property. By definition, emergent properties cannot be predicted solely by the isolated behavior of individual components. Consciousness cannot be predicted simply by the behavior of individual neurons; the complex shapes of a snowflake cannot be explained solely by the behavior of individual ice crystals. Instead, these patterns *emerge from the collective behavior of the entire system*.

As academic exploration of this topic has continued,[3] many researchers have adopted the term *complex adaptive system* to more precisely describe systems characterized by emergence. Over the last century, an extensive literature on these topics has developed across many disciplines, leading to a new subject known as complex systems science.[4] This new science has risen from roots in physics,[5] mathematics,[6] engineering,[7] and biology[8] to more recent manifestations in computer science,[9] economics,[10] sociology,[11] and other disciplines.[12]

This research has been both theoretical and empirical. Scientists have found many examples of emergence: adaptation (ecosystem evolution), learning (genetic algorithms), tiered networks (the structure of the Internet), and nested patterns (fractals).

These patterns are more than just the products of human perception. There is math behind complex adaptive systems, and it is possible to rigorously describe these patterns. For example, many complex networks—from the World Wide Web to the network of academic citations—show a highly skewed distribution of connections. In these networks, a relatively small number of nodes are responsible for a disproportionate proportion of the total connections.[13] These types of relationships can be found in the distribution of the size of animals, the values of oil reserves, and Wikipedia editing patterns. A common shorthand for this pattern is the 80/20 rule (where, for example, 20 percent of customers are responsible for 80 percent of a company's revenue), but, in fact, the mathematical pattern can hold across the entire range of values.[14]

One challenge in understanding complex adaptive systems is that much of the literature describes the characteristics of their emergent properties (after the fact), but there is no consensus on what a system needs to look like at the beginning (before the fact) to show these characteristics. That said, the complex systems literature offers hints as to the before the fact characteristics of organized complexity.[15] Here I offer one summary of these characteristics:

1. **The components are connected to each other.** For example, the brain is a set of neurons connected to each other by synapses. The connections themselves can vary in strength: the links among neurons in the brain vary significantly. The structure of the connections may exhibit hierarchy, clustering, or other types of order.[16]

2. **The interactions among components follow rules.**[17] For example, the Internet works because the interactions among routers are standardized. There are rules to determine how to break up a message into packets and send them via different pathways. Without standardized rules, the Internet would collapse into a muddle of incoherence.

3. **The interactions among components include both negative and positive feedback loops.** Consider an ant colony. When foraging ants discover food, they release pheromones to attract their siblings; as those new ants come, they release more pheromones, attracting more ants (a positive feedback loop). But the presence of many ants may then attract a predator (a negative feedback loop), leading the ants to release different pheromones to signal retreat.[18] Together, these feedback loops allow an ant colony to act as a single organism far greater than the sum of its ants.[19]

4. **The components optimize.** Consider the structure of a river system. Individual droplets of water want to follow gravity and roll downhill. This optimization leads to an aggregate sense of direction to the branching patterns of the system. It is worth noting here that for a component to optimize it need not exhibit consciousness: a bacteria might move toward food and an algorithmic trading platform seek profit, yet neither requires a conscious goal.

5. **The system interacts with the world outside of its boundary.**[20] Consider a genome. It is only meaningful in interaction with the world around it. For genetic code to unfold into a living being, it must extract energy from its surroundings (provided by, for example, a gestating mother or sunlight on a plant). Moreover, the genome itself only changes over time because it interacts with the world through natural selection.

6. **The system contains information.**[21] For example, in a market, prices convey information about value, supply, and demand. That information may change as the market interacts with the world around it—and, indeed, may change behavior over time. Similarly, the position of a bird in a flock or the gradient of ant pheromones conveys information to animals around it. Indeed, components sometimes act in anticipation of how other components will act in the future.

7. **Components enter and exit the system over time.** When you see a fallen log covered with mushrooms, you are seeing the cycling of nutrients through a system. The mushrooms enter the ecosystem through use of the nutrients of the tree that is exiting that same ecosystem. Put another way, there is both birth and death in a dynamic system. We see this in business as well: start-ups threaten established players; the sale of distressed assets creates opportunities for new entrants.[22]

Systems theory and philanthropy

So, is philanthropy a system? Are there lessons we might apply to help philanthropy become greater than the sum of its parts?

First, let us return to a version of the original question posed above: Is philanthropy a system? If we rely on the basic definitions offered above, the answer is an equivocal "yes."

— **Is it a set of components?** Yes. The nonprofit marketplace includes, most importantly, nonprofits and donors as well as some intermediary organizations and institutions. In the United States alone there are more than a million nonprofits, more than 100 million donors, and thousands of intermediaries.

— **Do the components interact?** Yes. Foundations grant money to nonprofits. Nonprofits ask for money from donors and provide information. Often, intermediaries mediate these relationships.

— **Is there a boundary around the components?** For the most part. In the U.S. context we have the important boundary of the tax code. Donors will not get a tax deduction if the recipient is not a 501(c)(3) nonprofit. In an era of impact investing and social business this is an imperfect and malleable boundary, but much of the structure of the nonprofit marketplace has built up in reaction to it. We also have a more amorphous sense of collective identity: those engaged in private action for public good. That identity—fuzzy as it may be—is its own kind of boundary.

If we consider common ex post characteristics of complex adaptive systems (learning, adaptation, resilience, resource efficiency, emergent order), it could certainly be said that the nonprofit marketplace at least occasionally exhibits these qualities.[23] But some observers of philanthropy agree that, although the sector might learn and evolve, it does so with limited impact, dynamism, or richness. There is abundant room for improvement.

1. **Is there connectivity among components?** There is, but it is inconsistent. Some nonprofits are part of formal institutional networks. Others are a part of informal communities. Donation aggregators such as community foundations, national donor-advised funds, and online giving platforms create an element of structure to financial connectivity.

2. **Do interactions among components follow rules?** Occasionally. Some donors will have specific rules driving their giving decisions, but most make decisions in a relatively ad hoc fashion. Some nonprofits will have specific rules for which donors they solicit, or at what level. Most partnership decisions are sui generis and have high transaction costs.

3. **Do the interactions among components include both negative and positive feedback loops?** Yes, but they tend to be weak. Donors tend to get more solicitations from nonprofits they donated to (a positive feedback loop). Beneficiary feedback is important for many organizations but tends to have a weak influence on behavior. Too often, successful organizations see a drop in funding (a negative feedback loop) because funders see them as "not needing our money."

4. **Do the components optimize?** Yes, but asymmetrically. Nonprofits quite explicitly want to raise more money. Less explicitly—though importantly!—most leaders across philanthropy desire to maximize their social impact. And organizations tend to seek self-preservation, an admittedly selfish goal (though without it we would have no institutional longevity).

5. **Is the system open, and does it interact with the world outside of its boundary?** Yes. Most of philanthropy relies on financial and human capital from outside of its boundary. Donors and nonprofits react—with varying degrees of efficiency—to changes in law, policy, cultural discourse, media, and collective understanding of best practices.

6. **Is there a way for information to flow through the system?** Yes, but it does so inconsistently. Uneven monitoring and evaluation systems make it difficult to gauge impact. Financial reporting systems are more consistent but too often substitute for more important data on results.

7. **Does the system have both entrance and exit?** Yes, but it appears to be asymmetric. The number of new nonprofit organizations continues to far outpace the exit of organizations. And there are notable difficulties in smart recycling of organizations that have outlived their usefulness or could better serve their missions in combination with another.

Potential strategic consequences

In its current form, philanthropy inconsistently shows the before the fact characteristics of a complex adaptive system. Many leaders in philanthropy want it—want us—to show more of the after the fact characteristics of such a system: learning, adaptation, resilience, systems-level efficiency. So, are there things we could do as a field to move toward the behavior of a complex adaptive system?

There are two pieces of good news. First, it is possible to articulate—at least in general terms—what we might do to strengthen the chance of philanthropy's showing the behavior of a complex adaptive system. Second, many existing field-level initiatives are already moving philanthropy in that direction—we have many bright spots to give us hope.

So let me offer a set of potential lessons for philanthropy from complex systems science:

1. **Be intentional about connectivity.** The relatively weak connectivity of philanthropy dampens the potential influence of feedback loops, simple rules, and goal orientation. Those characteristics are not useful unless they operate among components that actually interact with each other. To increase connectivity, perhaps the simplest thing to do is to increase the ease of connection—or, in simple terms, convenience for the end user. To increase convenience: (a) standardize interactions (e.g., provide donors information in a predictable format), and (b) make information available near where actors are already operating (e.g., add information about nonprofits in donors' online banking interfaces).

   – **Bright spots:** Growth of community foundations, national donor-advised funds, and online giving platforms; increase in use of existing GuideStar data through such platforms as Facebook and AmazonSmile.

2. **Simplify the rules.** If all interactions among components follow their own separate rules, it is very hard to achieve any systems-level efficiency (i.e., no economies of scale) or cumulative learning (i.e., components are constantly reinventing the wheel). Philanthropy's rules can be partly simplified by (a) creating and adopting common standards for information transfer (e.g., grant applications and reporting), and (b) standardizing and streamlining the transfer of money.

   – **Bright spots:** New data standards like the BRIDGE ID, Candid's Philanthropy Classification System, and the GuideStar Profile Standard; expansion of payment platforms like Network for Good and PayPal.

3. **Support feedback loops.** Weak feedback loops are commonly cited as a barrier to strong decision making in philanthropy. And, indeed, feedback is the prerequisite for learning: try something, see what happens, adjust. Efforts to enrich feedback loops among donors, nonprofits, and beneficiaries offer a chance to drive new kinds of learning in philanthropy.

   – Bright spots: Work by The Fund for Shared Insight, Feedback Labs, and Keystone Accountability to build beneficiary feedback loops; the Center for Effective Philanthropy's Grantee Perception Report and Staff Perception Report; new efforts by players like GivingSide to reflect donation history back to donors.

4. **Encourage goal orientation.** Philanthropy's version of optimization is goal orientation. The nonprofit sector is full of vague goals ("end poverty"), but it is possible to cultivate a more powerful kind of goal orientation. First, organizations should simply make clear statements about what their goals are (in as specific a way as possible). Second, they should formally share those statements. Third, they should build in an operational cadence to return to (and, if necessary, adjust) those goals over time.

   – Bright spots: Donor education programs like The Philanthropy Workshop and Social Venture Partners; work by Bridgespan and others on intended impact and theory of change.

5. **Embrace a common identity and interaction with the world around philanthropy.** The tax code offers one important boundary for philanthropy. But in an age of blended value and a shifting social contract, tax status is a weak and at times irrelevant boundary. Instead, we need an expansive and explicit sense of shared identity: the common purpose of building a better world.

   – **Bright spots**: Independent Sector's efforts to more clearly identify the common identity of civil society; work by innovators across impact investing and corporate social responsibility that encourage interaction between philanthropy and other parts of society.

6. **Enhance the flow of information through the system.** There is extraordinary opportunity to improve the collection, aggregation, and distribution of information throughout philanthropy. Most decisions are made with only a fragment of the available information. Improving the flow of information could radically increase the quality of decisions made by donors, nonprofit leaders, and others in philanthropy.

   – **Bright spots:** Growing strength of periodicals such as the Stanford Social Innovation Review; new discourse on what information about nonprofits matters, such as the Overhead Myth campaign; development of the broader networks of Candid.

7. **Embrace exit and recombination.** We need to encourage the more dynamic recombination of organizational resources—whether money, people, or ideas. Individual permanence is not necessary for collective richness, especially if an organization's time has passed. Organizations that step aside, merge, or seek acquisition deserve to be celebrated. They are contributing to the potential of our entire system.

   – **Bright spots:** Funders such as the Lodestar Foundation that explicitly support nonprofit mergers and acquisitions; new expertise in how to do those transactions well (e.g., from La Piana Consulting); increased vigilance from the IRS to decertify those nonprofits that do not file 990s for multiple years in a row.

Conclusion

By its very nature, emergence is a bottom-up process. I have highlighted a set of field-level strategies that could help philanthropy achieve its potential. And these are, in a sense, strategies viewed from the top down. And, indeed, there are many things that the leading institutions of the field—large foundations, major networks of nonprofits, key intermediary organizations—can do to enable bottom-up power.

But I should emphasize that, ultimately, capturing the systems-level potential of philanthropy will require distributed action. The actors on the front lines of social change are the living components that make up the system of philanthropy. It will be their choices that determine our collective fate. Every player in philanthropy can make individual choices about their practice to enhance our collective power. Donors can enhance their own goal orientation by forcing themselves to articulate specific goals. Foundations can share data about their grants through common data standards. Nonprofits can build ways to fold structured feedback from their constituents into their decision making. And we can all act in full knowledge of our connections to each other.

The community of those devoted to private action for public good—philanthropy—has offered immense value to society. But we have not yet risen to our potential. We remain less than the sum of our parts. All around us, though, the world offers lessons on how systems can unfold into something greater. We would be wise to try to learn from them.

This will not always be easy. We are speaking here of no less than the constant cycling of life and death. But the lessons of complex systems science offer us hope for a philanthropic sector that mirrors the best of life: creation, vitality, richness. We can build a philanthropic community that reflects the best that nature teaches us. And along the way we can realize more of that greater good. Philanthropy can be greater than the sum of its—of *our*—many parts.

Endnotes

1 Katherine Fulton and Andrew Blau, “Cultivating Change in Philanthropy” (Monitor Group LLP, 2005), 7. Fulton and Blau qualify their statement: “This is not to say that donors and foundations don’t relate or learn from one another at all. They do, but only to the extent that they choose to. And they also compete with one another—for ideas, reputation, and credit, which can discourage the free exchange of ideas and lead to fragmentation of effort and isolation.”

2 Warren Weaver, "Science and Complexity," *American Scientist* 36 (1948): 536.

3 Later in “Science and Complexity,” Weaver highlighted two “wartime advances” he considered promising for tackling organized complexity: the new power of “electronic computing devices” and a rising trend toward academic interdisciplinarity (what he called “the ‘mixed team’ approach of operations analysis” [p. 541]). It seems he was prescient in more ways than one.

4 It is worth emphasizing that the author is no expert in complex systems science, only an enthusiastic amateur. But I did have the privilege of spending five weeks in 2004 in Beijing attending “Complex Systems Summer School,” hosted by the Institute for Theoretical Physics of the Chinese Academy of Sciences in partnership with the Santa Fe Institute. Much of the analysis here is based on what I learned there. I am thankful for feedback on this paper from multiple sources, notably Aaron Clauset of the University of Colorado, Brian Trelstad of Bridges Ventures, and my father, David Harold.

5 Erwin Schrodinger, *What Is Life?* (Cambridge University Press, 1944); Ilya Prigogine, *Order Out of Chaos* (Bantam, 1984).

6 John von Neumann, *Theory of Self-Reproducing Automata* (Champaign, IL: University of Illinois Press, 1966); Bernard Mandelbrot, *The Fractal Geometry of Nature* (New York: Freeman, 1983).

7 Norbert Wiener, *Cybernetics: or Control and Communication in the Animal and Machine* (New York: MIT Press, 1961); Claude Shannon and Warren Weaver, *The Mathematical Theory of Communication* (University of Illinois Press, 1971).

8 Stuart Kauffman, *The Origins of Order: Self-Organization and Selection in Evolution* (New York: Oxford University Press, 1993). Geoffrey West, *Geoffrey* (New York: Penguin Press, 2017).

9 John Holland, et al., *Induction: Processes of Inference, Learning and Discovery* (Cambridge, MA: MIT Press, 1986).

10 Philip Anderson, Ken Arrow, and David Pines, eds., *The Economy as an Evolving Complex System* (Redwood City, CA: Addison-Wesley, 1988). Eric Beinhocker, *The Origin of Wealth: Evolution, Complexity, and the Radical Remaking of Economics* (Cambridge, MA: Harvard Business School Press, 2006).

11 Duncan Watts and S.H. Strogatz, "Collective Dynamics of 'Small-World' Networks," *Nature* 393 (June 4, 1998): 440-42.

12 Much of this research has been centered at the Santa Fe Institute. See Mitchell Waldrop, *Complexity: The Emerging Science at the Edge of Order and Chaos* (New York: Touchstone, 1992).

13 There is evidence that many real-world networks follow a precise, fractal-like pattern where connections among nodes follow a power law distribution: $f(x)=ax^{-k}$. See A. Barabasi and R. Albert, “Emergence of Scaling in Random Networks,” *Science* 286 (October 15, 1999). Others argue that this relationship has been exaggerated; see, for example: A. Clauset, C.R. Shalizi, and M.E.J. Newman, "Power-Law Distributions in Empirical Data," *SIAM Review* 51, no. 4 (Nov. 6, 2009): 661-703.

14 There are many other cases of mathematical patterns of emergence. Models of interacting switches settle down to a stable number of cycles—even when the initial values are set randomly. The number of cycles is approximately the square root of the number of switches. And, indeed, as genes are themselves switches, the number of types of cells in a given species is consistently the square root of the number of genes in its genome. (See Stuart Kauffman, *At Home in the Universe* [New York: Oxford University Press, 1995].) These extraordinary patterns we see in the world are not just figments of our imagination. They can—often—be described by mathematics.

15 Again, there is no consensus on these characteristics, and I emphasize my amateur role here. But see, for example, John Holland, *Hidden Order* (Reading, MA: Addison-Wesley,1995).

16 See, for example, p. 83 in Kauffman's *At Home in the Universe.* The structure can take other forms, too, such as the emergent tiers of trophic levels in an ecosystem.

17 These rules need not be immutable—they can change over time. But if there is not some stability it is unlikely the system will exhibit truly complex behavior.

18 Another example of a negative feedback loop is a thermostat: If the temperature gets too hot, the thermostat turns on the air conditioning. And when the rich get richer because the possession of capital makes it easier to have high income—well, that is a positive feedback loop, summarized by Thomas Piketty as "r>g"—the rate of return on capital is higher than the economic growth rate *(Capital in the Twenty-First Century* [Cambridge, MA: Harvard University Press, 2014]).

19 These feedback loops can be either internal (among components) or external (between components and forces outside of the boundary).

20 This is known as an open system. Per the Second Law of Thermodynamics a system must be open if it is to retain or increase its order.

21 That information could take many forms from DNA or securities prices.

22 This is related to—although not the same as—Joseph Schumpeter's concept of creative destruction, what he called the "process of industrial mutation that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one." *(Capitalism, Socialism, and Democracy* [London: Routledge, 1942].)

23 Per note 13 on power laws, it does appear that the nonprofit marketplace has some characteristics of scale-free networks. For example, the distributions of nonprofit revenue follow a power law relationship.

About the author

Jacob Harold is executive vice president at Candid, a nonprofit formed when Foundation Center and GuideStar joined forces in February 2019. As president and CEO of GuideStar, Harold worked closely with colleagues at Foundation Center to form Candid in 2019. During his tenure at GuideStar, he oversaw a doubling of the organization's reach, the creation of the GuideStar Profile Program, the launch of the Overhead Myth campaign, and hundreds of new partnerships.

Harold came to GuideStar from the Hewlett Foundation, where he led grantmaking for the Philanthropy Program. Between 2006 and 2012, he oversaw $30 million in grants that, together, aimed to build a 21st-century infrastructure for smart giving. At the beginning of his career, Jacob worked as a climate change campaigner for Rainforest Action Network and Greenpeace USA and as organizing director at Citizen Works. He also worked as a consultant to nonprofits and foundations at the Bridgespan Group and as a climate change strategist for the David and Lucile Packard Foundation based at The Energy and Resources Institute in New Delhi, India.

Jacob was named to the 2014, 2015, 2016, 2017, 2018, and 2019 NonProfit Times (NPT) Power and Influence Top 50 lists. He served as a term member for the Council on Foreign Relations and on the advisory boards of Bright Funds Foundation, Emerging Practitioners in Philanthropy and Docusign IMPACT. He currently serves on the advisory boards of the Center for Effective Philanthropy and the Duke University Center for the Advancement of Social Entrepreneurship and is a member of the editorial board of the Nonprofit and Voluntary Sector Quarterly.

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