

2019 American Society for Clinical Investigation Presidential Address

The ownership paradox: nurturing continuity and change for the future ASCI

Kieren A. Marr

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ASCI Presidential Address

Introduction Dear friends, colleagues, and mentors, it has been a tremendous honor for me to serve the society for the past several years. This time has been one of reflection, growth, and change for me, both professionally and personally, and I stand before you humbled and inspired by your work, the depth of our society's tradition, and the importance of our mission. I sincerely thank you, the membership, for entrusting me to serve and to lead. I thank the Council for your friendship, your support, and your dedication, and I thank the executive leadership team for your guidance and your expertise. Later I will draw attention to some of the individuals who have been instrumental to the ASCI over the last year; for now, please accept my introduction of gratitude. I have prepared for this moment in a similar manner to those who came before me, with a study of Presidential Addresses delivered since 1939. This is an arduous, but rewarding task, as these addresses illustrate overarching thematic concerns to our society for over a century. As we reflect on where we have been and who we are today, an important reminder is that the ASCI was developed by the need for change, and to reinforce change. We are structured as a society to recognize excellent young physician-scientists. As part [...]

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Introduction

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I have prepared for this moment in a similar manner to those who came before me, with a study of Presidential Addresses delivered since 1939. This is an arduous, but rewarding task, as these addresses illustrate overarching thematic concerns to our society for over a century. As we reflect on where we have been and who we are today, an important reminder is that the ASCI was developed by the need for change, and to reinforce change. We are structured as a society to recognize excellent young physician-scientists. As part of the ASCI's inception, the youth label represented more than age, but also signified a rebel, non-authoritarian outlook underlying physician-scientists who worked with then new scientific methods (1). Now, more than 100 years later, it's hard to imagine that establishing a scientific foundation to medicine was such a foreign concept that it would have required an entire change

movement to establish momentum — but it did. This reflection was the impetus of a question that guided my last year as president of the Council — *what do we need to do today to enable this society to remain continuous, whilst promoting change that is inherent to and born out of our growth as physician scientists?*

Indeed, the tension between continuity and change has caused angst to many prior ASCI presidents. Core themes that emerged include the identity of the "new" physician-scientist, definitions of clinical science itself, and stresses within funding and training. I would recommend that anyone who wants to understand our society, or the history of physician-scientists, invest time in reading the ASCI Presidential Addresses published in *JCI*. You will appreciate how historical events, time-dependent cultural shifts, and individual personalities flavored the content, perspective, and approach to our written history.

The ownership paradox

The ASCI is an honorary society that was initiated during a period of change. We exist to recognize, support, and promote the work of young physician-scientists, towards the overall goal of "improving the health of all people." A paradox arises when considering how to assure continuity of our organization whilst enabling the nimbleness to stay in integrity with our founders' mission of promoting change. This is what I'm calling an "ownership paradox."

Ownership refers to the personal motivations that are instrumental in informing organizational culture. Building a culture of ownership is similar to that of accountability but differs in that the latter is typically more externally imposed. In contrast, people who care about a mission and share an

organizational vision can not only account for, but "own" their roles in an organization. A simple behavioral analogy illustrates this distinction: no one changes the oil of or washes rented cars — but when we own a car, we care for it to assure longevity. The concept of a shared ownership culture has been evoked to support policy movements, such as those pertinent to public and environment health (2). On an organizational level, shared ownership is instrumental for employee satisfaction and growth, and it's been cited as an essential element to promote safety in health care (3, 4). However, one problem that arises in health care is a tension generated from a hierarchical structure, which more naturally motivates externally, through rewards and punishment (5).

Perhaps the best analogy for an ownership paradox is that which we experience as parents. At very early years, parents must own our roles. Feeding, cleaning, and transporting these beings through time and growth requires not just 100% accountability, but the internal diligence of true caring — an ownership culture. However, as our children grow and have become their own semiautonomous human beings, our sense of ownership has to be tolerant of change. As the mother of teenage daughters, I'm now frequently reminded of my role as a "renter."

Similarly, the written history of ASCI Presidential Addresses illustrates the challenges the society has faced in assuring societal continuity whilst functioning in a world of vast change. Ultimately, the membership is transient, and the leaders are volunteers. As the mission of supporting physician-scientists is greatly impacted by extrinsic forces, such as the economic environment that dictates research funding, every ASCI Council member has reflected on how much he or she is accountable for the fate of the organization. While we are elected for our individual scientific achievements, those skills are not necessarily what we need to lead a nonprofit organization.

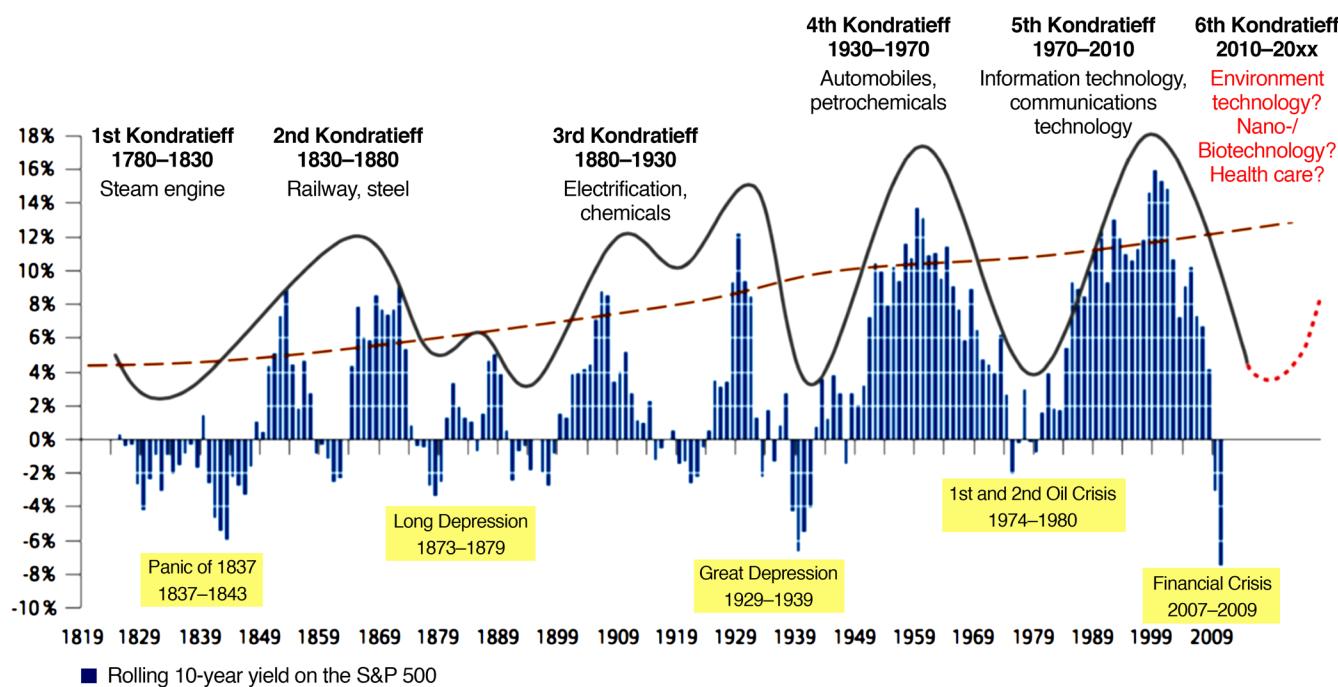


Figure 1. Kondratieff cycles (from ref. 11). The rolling 10-year yield on the S&P 500 is shown on the y axis, in percentage. Reprinted by permission from Springer Nature: Springer, Cham, “Creative Destruction, Long Waves and the Age of the Smart City” by Michael Batty © 2016.

I believe that supporting the mission of the society — assuring the continuity of physician-scientists — mandates that we create a more transparent culture of ownership. This requires teamwork, an appetite for change, and assurance of organizational diversity. Like parents, we need to be accountable enough to “own” the outcomes of our behaviors and our decisions, and know when action is needed to assure health of the ASCI; at the same time, we need to understand the transience of our roles, as we are ultimately passing on the baton of ownership to future generations who will work in a world of massive,

sometimes unpredictable scientific and economic change. Like our children, the body of evidence that we have created as physician-scientists continues to mature; a paradox emerges from the need to simultaneously assure continuity and nurture change.

Science, evidence, and technology changes

Change is inherent to discovery and technologic advancement, yet it is one of the strongest forces of human discomfort. Our inability to imagine the future and accept the unknown has certainly been illustrat-

ed by many famous physician-scientists. In a famous quote presented in 1919, Osler warned, “*The extraordinary development of modern science may be her undoing. Specialism, now a necessity, has fragmented the specialties themselves in a way that makes the outlook hazardous. The workers lose all sense of proportion in a maze of minutiae*” (6). While there is wisdom in this statement, even Osler failed to envision that technologic developments would emerge to not only enable scientists to manage the maze of minutiae, but to harness the power in big data sets.

Warnings of growth and the implications of complexity have also been a recurrent theme in the historical records of the ASCI Presidential Addresses. Change has led to some very grim depictions of the future by some of our past presidents. Indeed, the 1939 address given by Dr. Tinsley Randolph Harrison presented a unique launching point: “*If we assume that a presidential address has any useful function at all, it follows that this function is to try to benefit the organization to which the address is delivered. Such a purpose can best be served, not by praising accomplishments of the past, but by considering the dangers of the future.*” He went on to outline a “disease” that he termed institutional arteriosclerosis, in which societies, like individuals, grow to reach maturity, then accomplish

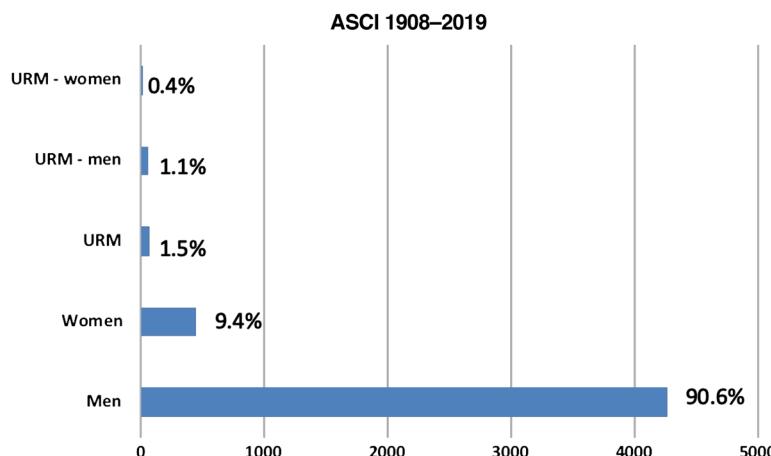


Figure 2. ASCI membership composition, 1908–2019. Absolute numbers for each group and relative percentages are shown. URM, underrepresented minorities.



Marian Wilkins Ropes
(ASCI, elected 1940)

Figure 3. The first female ASCI inductee,
Marian Wilkins Ropes, elected to ASCI in 1940.

little, and ultimately decay (7). After reading many such warnings of “decay” and the impending demise of physician-scientists, I decided that this year I would focus on the more positive outcomes of change.

Other ASCI presidents have discussed various aspects of technologic change, and most recently, innovation, with different understandings and analogies. In 1952,

Dr. Barry Wood delivered his address entitled, “The ‘Logarithmic Phase’ of Medical Progress.” He described the productivity and growth of medical knowledge in the mid-20th century as similar to that of a conventional bacterial growth curve, with a lag phase, a logarithmic phase, and a stationary phase (8). As a microbiologist, I find the analogy somewhat appealing, but it does not adequately depict growth dynamics that reflect the iterative nature of scientific discovery. With the benefit of having the whole century of medical science to examine, one can contextualize our scientific history, and better understand some of the warnings that have been delivered, using economic theories.

An important theory of technologic growth was borne out of the observation that disruptive innovations create cycles that ultimately come and go, in a wavelike fashion (9, 10). These waves, called Kondratiev waves (or K-waves for short), are initiated by the development of technologies that create new ways of living and working. Figure 1 demonstrates these waves by depicting the pace of large innovations on the *y* axis and years on the *x* axis (11). The wavelike appearance is created by disruptive technologies that

grow over time, reflecting technologic dissemination and adoption, which ultimately gives rise to new industries and the spread of discovery. However, technologic growth subsequently slows and enters a downswing, as one technology leads to development of another, sometimes resulting in replacement, through major changes in the way that we do things.

These waves were initially described in the beginning of the 20th century by a Russian economist (Kondratiev). In the middle of the 20th century, another influential economist named Joseph Schumpeter suggested that technology grows on itself in this way, creating an acceleration of the waves, such that growth becomes faster, and the years between major innovations become shorter (9). In a general sense, these development cycles impact the way we live, creating broad eras of advancement. In early eras, technologies to harness power through water, develop textiles, and use iron impacted human life by enabling the machine manufacture of clothing and transportation. There was a century of growth in transportation. More recently, information technology has created a communication era.



Figure 4. Female ASCI Council members, pre-2000.



Barbara L. Weber
(President, 2006–2007)



Nancy C. Andrews
(President, 2008–2009)



Elizabeth M. McNally
(President, 2011–2012)



Vivian G. Cheung
(President, 2016–2017)

Figure 5. Four female ASCI presidents, 2001–2018.



Manuel Martinez Maldonado
(ASCI, elected 1973)

Figure 6. The first underrepresented minority ASCI inductee, Manuel Martinez Maldonado, elected to ASCI in 1973.

Why is this relevant? Consider that the ASCI, and our current approach to medical sciences, were born during the upswing of the third technologic wave, which was created by advancements in chemistry, electricity, and the internal combustion engine. Studying our ASCI written history with these technology cycles in mind, it becomes evident that many of the most pessimistic predictions emerged during periods of economic decline that followed the upswings brought about by growth and change. Consider that our role as physician-scientists is both to discover — or cause change — and to most effectively utilize the tools that come of technology development. If we understand these dynamics of change, it becomes easier to adapt to the ups and downs inherent in anticipated economic cycles and the future unknown. Right now we're in the sixth wave, characterized by growth emergent from application of information technology and data science.

The contrasting outlook of growth cycles can be appreciated in the current debate on the impact of precision medicine. In a recent issue of *JCI*, Rosen and Zeger presented their perspective while taking a positive outlook, “riding up” the technologic wave: “*American medicine is on the precipice of dramatic change, forced by disruptive technologies in measurement, computation, and communication*” (12). In the same issue, Joyner and Paneth offer a Viewpoint in which they appear to be acknowledging stalled growth, or even “riding down” the wave, especially in the application of genomics towards precision medicine: “*Nearly two decades after the first predictions of dramatic success, we find no impact of the human genome project on the population’s life expectancy or any other public health measure, notwithstanding the vast resources that have been directed at genomics*” (13). Is it possible that both these accounts are correct, and what we have observed is the wavelike motion of scientific discovery and then stalled dissemination and advancement? Either way, the dynamics of technologic change do not predict doom for the physician-scientist community, but instead, emphasize that we are central to — and impacted by — iterative cycles of growth. You may sense some of this change in this year’s meeting, with themes in immunotherapy and big data.

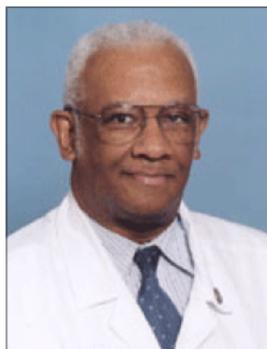
A more personal lesson here is to embrace change as the result of, and inherent to the process of our own growth. Studying how this happens has expanded my viewpoint on the subject. I reflect back on one auspicious moment as a Duke intern some years ago. Working late at night, I observed a fellow intern sitting at a recently installed computer station, using a platform that he patiently described to

me as “email.” My response to him was that this email thing is a passing fancy and that he should instead do something important with his time. This was clearly an auspicious predictor. I still think that email absorbs too much time and I stumble through all things electronic. And you probably wouldn’t be surprised that the intern who introduced me to email later became the chief medical officer for WebMD. We should all pay attention to these auspicious “email” moments as they may be predictors of the future.

The discussion on technological change also presents another consideration for the ASCI as we look towards the future — the definition of science and the composition of our membership. If we consider that the society was developed to promote physician-scientists in the emerging industry of evidence-based medicine, and that science is influenced by technologies that grow iteratively over time, how can we be anything other than a society that honors the contributions of physician-scientists who use different technologies towards hypothesis-driven science? In evaluating the cycles of innovation in technology over the history of the ASCI, I see a compelling argument for the nurturing of a diverse membership of physician-scientists defined by excellence across basic, lab-driven mechanism research and those who utilize newer tools to perform discovery science. The composition, and culture, of the ASCI continues to evolve.

Culture changes

Over the last several years I had the privilege of studying business and management at MIT. This was compelled by a desire to learn a scientific foundation for innovation and leadership. I grew tremen-



Aubrey R. Morrison
(ASCI, elected 1982)



James R. Gavin III
(ASCI, elected 1985)



Augustus O. Grant
(ASCI, elected 1990)



Griffin Platt Rodgers
(ASCI, elected 1994)

Figure 7. The first African American men elected to ASCI, pre-2000.

dously and would definitely recommend cross-disciplinary education as a very productive midlife crisis! One big takeaway lesson that I feel is relevant to our field right now is the impact of culture on making change. I learned to see organizations through three lenses, which include structure (or strategic design), culture, and politics. If you want to make change, a view from any of these three lenses demonstrates the different levers that can compel change. Here, I'd like to examine the ASCI through the cultural lens.

Promotion of a diverse culture is one of the most important elements to enable advancement in science and health of organizations; in this annual meeting, we made deliberate decisions to highlight this topic, and tomorrow I would encourage you to attend the morning special

session focused on the National Academy report on sexual harassment of women in academic sciences, engineering, and medicine. In a robust, scientific report, the National Academies, including some of our colleagues sitting here, reviewed data and provided 15 recommendations to improve workplace culture; most prominently, this includes moving beyond legal compliance by improving transparency and accountability, striving for strong and diverse leadership, and making the entire academic community responsible for reducing and preventing sexual harassment. One specific recommendation is to encourage involvement of professional societies and other organizations (14).

In an effort to own our role in shaping the culture of the physician-scientist community, I sought to review the com-

position, and the culture, of the ASCI. First, let me thank John Hawley for helping me with manual data extraction to understand demographics that were poorly tracked over history. For the same reason, there may be errors in measurements, so if you can update our data, please do so. Figure 2 summarizes our membership composition to date, summarizing that approximately 90% of our membership are men, and 10% women. Only 1.5% of the membership are identified as within an underrepresented minority group. The smallest demographic are minority women, of which we have elected only 18.

The first woman elected is Dr. Marian Wilkins Ropes (Figure 3), who became a member of ASCI in 1940. She was also the first female medical resident and assis-



Olufunmilayo (Funmi) Olopade
(ASCI, elected 2003)

Figure 8. The first African female ASCI inductee, Olufunmilayo Olopade, elected to ASCI in 2003.



E. Dale Abel
(Council, 2009–2012)



Levi Garraway
(President, 2015–2016;
Officer, 2013–2016)



Rexford S. Ahima
(JCI Editor, 2018–present)

Figure 9. Three African American men of the ASCI Council since 2009.



Figure 10. Many diverse faces of ASCI members elected after 2000.

tant professor at the Mass General Hospital, where she studied autoimmunity. She set the stage for many more women to be elected, and eventually to serve on Council. Figure 4 shows the women who served in Council during the 20th century, with Dr. Judith Swain as the first female president in the 1990s. Since 2000, the Council has varied in gender distribution, ranging from 18% to 55% women. Before me, four more women have served as president (Figure 5).

Although data have been poorly tracked, we believe that the first underrepresented minority elected into ASCI was Dr. Manuel Martinez Maldonado, a nephrologist originally from Puerto Rico, elected in 1973 (Figure 6). Four African American men were elected prior to 2000 (Figure 7), and in 2003, Dr. Funmi Olopade became our first ASCI African woman, originally from Nigeria (Figure 8). Finally, three underrepresented minority men have served on the Council in different roles, after 2009. Levi Garraway was the first underrepresented minority officer (2013–2016) and president (2015–2016) (Figure 9).

Why is this important? Because culture is shaped by — and directly impacts — diversity. We not only want to promote a membership and leadership that adequately reflects societal changes, but one that is prepared to lead healthy change in the future. As the National Academies report illustrates, academic institutions have historically done this poorly. This year, attention has been drawn to several institutions that have made deliberate changes to the symbols that they display in their surroundings in order to promote a more diverse working environment.

If you saw your face in any of the figures presented, I want to thank you. Being the first in anything is a personally brave and important act of leadership, as you ultimately create opportunity for newer generations. In this century, we have elected many different faces and Figure 10 serves as a healthy symbol of a more diverse ASCI. Our promotion of cultural change will bode well for our role in supporting the diverse community of physician-scientists in the future.

Priorities change

I can't talk about ownership, continuity, and change without ending on priorities. Our ASCI Council this year understood that our role was more than to elect new members, but to own our leadership to enable continuity, and change. Following the organization's mission statement, created in 2012, we worked to establish a small number of strategic priorities that will better enable us to use our societal resources to support physician-scientists. We developed structures to create more transparency in the organization, and initiated a new program to improve our Institutional Representatives program. Much of this has been summarized in a recent Viewpoint in *JCI* (15), and we will detail progress in the business meeting this evening.

As honorary societies, individuals are celebrated for transformative discovery. It's easy to overly idolize and create symbols that serve as barriers to teamwork — so I really want to emphasize the strength of our society as a team. Our executive leadership, John Hawley and Karen Guth, serve their positions with skill, enthusiasm, approachability, and provide the experience of decades. I need to say a very large thank-you to Dr. Kim Rathmell, who is your next president. With several years of service on Council, insight, and unparalleled energy, Kim has been instrumental with everything that we have done this year. She embodies the notion of leading through ownership. This group has been phenomenal to work with.

Finally, to the new members, congratulations. Your work has been recognized as excellent and transformative and you're now part of a team of colleagues that form this historical — but not old — honorary society. To assure a healthy future, I encourage you to "own" your roles by active participation in the primary mission of supporting physician-scientists. Ultimately, the culture that supports growth, honors diversity, and rewards this level of engagement will ensure continuity and future change for physician-scientists.

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