

## Commentary

# The scientific director: A complementary model for academic leadership

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The current model for academic leadership places unique demands on scientists with highly active research programs. A complementary model with a dedicated scientific director could remove this strain and allow a greater institutional investment in the community via a partnership. This article explores the rationale and framework of this model.

Academic leaders in science must proactively and deliberately address the needs of all members of their institution. Traditionally these leadership roles (e.g., departmental chairs, center directors, etc.) are filled by senior faculty with highly active research programs. However, doing so sets up the inevitable challenge whereby leaders must balance the demands of the role with that of their own research. In recent years, a growing recognition of the importance of investing in all aspects of institutional culture well beyond the primary areas and tasks traditionally associated with a leadership role has added to the challenge.<sup>1–5</sup> These new frontiers include participating in executive-level strategic planning, strengthening interdisciplinary collaborations and “team science,” increasing mentoring and support of junior faculty, sustaining efforts to advance diversity, equity, and inclusion (DEI), as well as engaging in community outreach and philanthropic endeavors. The capacity for academic leaders to attend to and invest in these increasingly important areas is a challenge that splits time and energy between their own research and the needs of their institution, creating a potential conflict in which resources given to one threaten to detract from the other. In some cases, investment in one or more of these areas is assigned to other faculty (vice chairs, associate directors, and so on), but this simply passes on to another the same challenge of balancing research, educational, and leadership roles.

To address this challenge, we at the Department of Genetics at Yale School of Medicine, as well as other institutions,

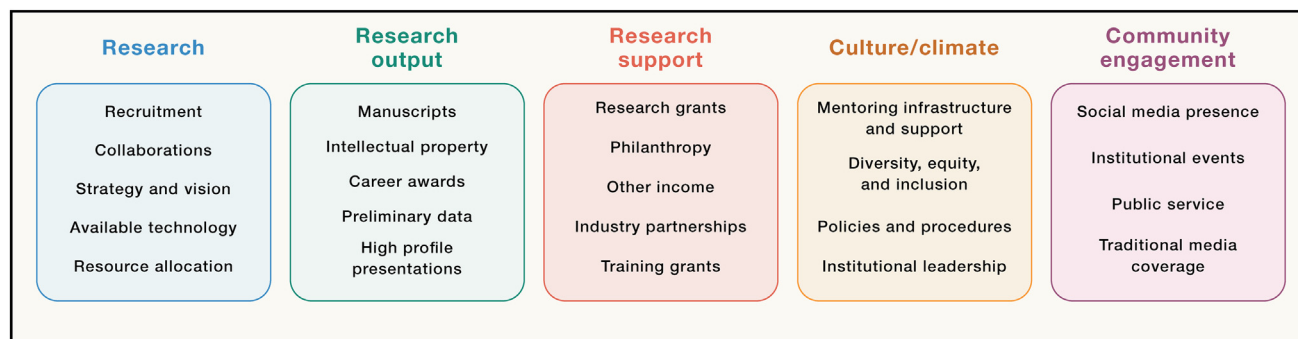
have adopted a framework of complementary leadership that exists as a partnership between the chair and an additional executive-level scientist called the scientific director. In this commentary, and as authors representing both roles, we make the case for this framework as necessary to meet the growing needs of departments and to ensure the scientific and professional fulfillment of its members. We use a department setting as an example, although this model could be used at any organizational level within academic research. Critically, the scientific director does not run their own independent research program and so has the capacity to drive continuous investment in and growth of the department across a multitude of areas with great efficiency. They can also partner with individual investigators to support their scientific and professional growth in a highly personalized manner, either alone or as part of a larger team. This role is already in place in a small number of state and private institutions, reflecting a growing investment in research management infrastructure.<sup>6,7</sup> However, the role is often poorly defined and lacks a broader acceptance as a *bona fide* leadership structure. The purpose of this article is to shine a light on this role as a critical component of institutional leadership in academic science and to provide key insights into what makes this role so effective.

### Leadership as a balancing act

The classical framework for institutional governance provides scientific leadership via a chair and administrative leadership supported by a director of finance and

administration. In this model, a newly elected chair must transition from spending the majority of their time and energy thinking about their own research to taking on a new form of leadership and accountability to an entire community of faculty, staff, and trainees as well as to the larger institutional framework within which the department sits. What is particularly notable is how the two roles—principal investigator (PI) and chair—require a different set of behaviors and skills. As PI, one tends to focus on the needs of their own lab and to develop the necessary skills to support this. These include the skills to effectively mentor trainees, produce papers, write grants, promote one’s own work and reputation, manage staff, and so on. As chair, one is required to be more community focused and spend time and energy attending to the needs and challenges of other PIs, the department as a whole, and the school and university. Not only do these dual roles each require a different set of skills, but performing both also sets up a balancing act whereby investing more energy in one area detracts from the other.

In the classical framework, it is the faculty themselves who are responsible for driving the growth and impact of their research through peer-to-peer mentoring, self-advocacy, and the formation of collaborative research networks. In order for this model of professional advancement to be equitable, however, equal access to opportunities and the ability to leverage them must be present. In reality, ample evidence demonstrates that this is not the case. Certain groups, including women and people under-represented in



**Figure 1. The scientific director drives initiatives across multiple areas in parallel to advance scientific discovery and impact**

science, still face sizable barriers to their professional success. For example, it is well known that members of these groups are less likely to be considered for awards and promotions, less likely to be credited for their science, and more likely to bear additional work-related burdens as part of the so-called “minority tax.”<sup>8–12</sup> The fact that these barriers persist suggests that the classical framework for institutional leadership may not be sufficient to allow the investment of time and energy required to address them, in addition to other more widespread factors.

### The best of both worlds: A partnership in leading

An alternative to the classic framework is a model involving a PhD-level scientific director who reports to the chair. The two work collaboratively to advance scientific discovery and impact in alignment with the overall mission of the department and institution. One of the fundamental tenants of this model—known in organizational psychology as the leader-follower relationship—is that the division of labor depends on the complementarity of the skillset between the two.<sup>13</sup> For example, if the chair is highly proficient in strategizing and less proficient in project management, then the scientific director may focus their efforts more on project management to ensure that nothing “slips between the cracks.” If the chair is highly proficient in project management and less proficient in communication, the scientific director may spend considerable time meeting with others to ensure clear and consistent communication and to build consensus around key issues.

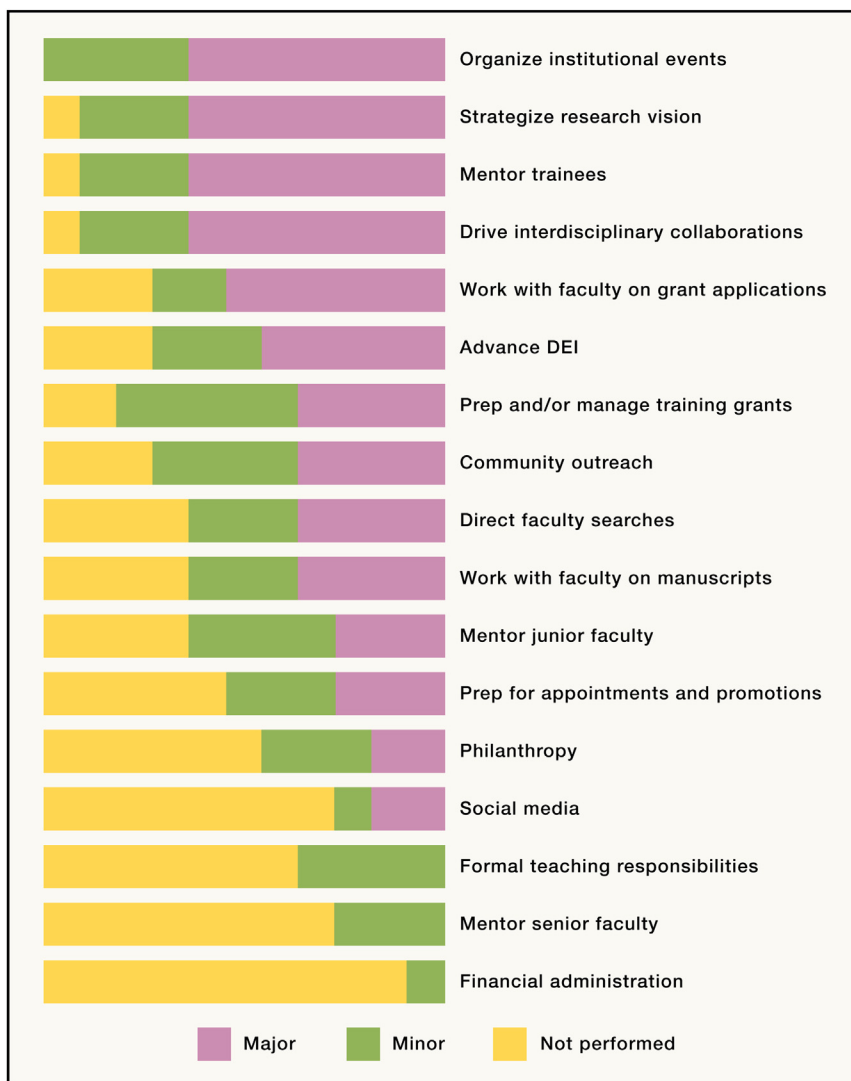
Crucial to the success of this collaboration is an acceptance of the limitations and strengths of both parties. If the leader can identify and accept their own limitations (whatever they are), then the follower gains the opportunity to “value-add” to the collaboration. Without this acceptance, it becomes very difficult to fully authorize the follower in their role. Because a great many skills are required to be both an effective leader and administrator, then it follows that where the scientific director focuses their time and energy depends on the relative proficiency of the chair in each skill and their capacity (in terms of time) to engage with it.

Broadly speaking, the goal of the scientific director is to maintain or increase scientific discovery and impact of their institution. Here, many variables are at play, from the scientific ideas themselves to the availability of funding, technical support, mentoring and professional support, institutional culture, and more. (Figure 1). Each institution will have its own priorities with regard to the desired growth across these different areas. Where the scientific director focuses their efforts depends on the interplay between these priorities and their own skills and experience. Some of the most common major tasks performed include driving interdisciplinary collaborations within and beyond their institution; leading the organization of key institutional events; developing the long-term vision of the institution; mentoring trainees and junior faculty; strategizing grant and manuscript submissions; directing faculty searches; ensuring equitable and inclusive processes and policies; and performing community outreach (Figure 2).

### Building better relationships

In order to be effective, the scientific director must balance the needs of faculty with the vision of the chair within the confines of the institutional mission. Hence, one of the advantages of this model is the opportunity for the scientific director to act as a “sounding board” in both directions: for the chair to present important counterpoints and considerations prior to any decision being implemented and for faculty to discuss their needs and how the institution can best meet them. The presence of the scientific director in subsequent related meetings serves to reinforce this structure. In this way, the expectations of the chair are actively managed, transparency is promoted, and faculty are better supported and empowered—the latter being particularly critical in situations where structural and socio-cultural hierarchy dictate a power imbalance.

The partnership between the scientific director and the chair and how others experience this partnership are both paramount to the success of the role. The chair must convey their conviction in the scientific director’s leadership and expertise and convey this to the other institutional members. An example of this would be for the scientific director to take the lead on certain items in faculty discussions, direct faculty searches, and participate in executive-level institutional planning. Indeed, a central theme in the leader-follower paradigm is that the follower has their own distinctive voice, which is heard alongside the leader’s. This, in turn, requires an extremely close and transparent relationship between the two, such that they do not act in ways that undermine



**Figure 2. Tasks performed by scientific director roles (or similar), either major, minor, or not performed**  
N = 11.

each other. It is also critical that the scientific director has strong credibility among the faculty in order to be able to lead effectively. Hence, because of the deeply entrenched hierarchical structure of academia, it is our recommendation to appoint the scientific director as ladder faculty (i.e., assistant professor or higher), as opposed to a staff or research scientist. However, if that option is not available, then institutions should explore alternatives, keeping in mind that execution of the role, as well as engagement and satisfaction, may be lower at the staff or research scientist level.

**Unlocking the potential for scientific discovery**

A common goal of academic institutions is to foster research innovation and discovery by encouraging collaborations between laboratories and across disciplines. This requires time and energy to contact and meet with individual investigators in order to determine potential research synergy, as well as an awareness of the breadth of expertise and research programs in the community. For many academics, this time and energy investment is a major barrier to exploring potential collaborations.<sup>5</sup> A

similar conflict also plays out in collaborative funding mechanisms, where potentially attractive ideas are not realized because of a lack of the time and energy it takes to lead a large team at the scientific and administrative levels. This is another context in which a scientific director can add value to the research enterprise, bringing together individual investigators in ways that are strategically targeted to enhance their research and leveraging collaborations toward new funding mechanisms that would otherwise be unattainable.

As an example, our scientific director recently played an indispensable role in driving the successful submission of a large inter-departmental cross-disciplinary research grant. Her role in this case encompassed project management and strategic planning, due diligence, consensus building, project design, and work on the proposal itself. All four PIs—scientists and physician-scientists with highly active research programs and considerable administrative burdens—unequivocally agreed that the grant would not have been awarded without this partnership. To be capable of such work, the scientific director must foremost be a scientist, able to see both the big picture scientifically and the technical nuances that can make or break a collaboration and/or proposal. It also requires a strong working knowledge of the research interests, expertise, and future directions of every investigator in their department, as well as creativity and vision in identifying potential areas of research synergy across different disciplines.

**Targeted support allows all scientists to thrive**

In recent years, many institutions have sought to establish peer-to-peer support mechanisms such as formal mentoring relationships, faculty lunches, and grant and paper feedback sessions in order to meet the increasing demand for scientific and professional support across all career levels. These mechanisms are a vast improvement over traditional practices (or lack thereof), particularly for early-career researchers who might otherwise be left to “sink or swim.” At the same time, we have observed that it is difficult to consistently offer every participant the level of support they require at the precise

time that they require it. Furthermore, inconsistencies in scheduling meetings, participation, and meaningful engagement means that the overall quality of support an individual receives can vary significantly within a single institution, which is inequitable. While a scientific director cannot and should not replace these important peer-to-peer mechanisms, they can augment them by providing tailored scientific and professional support to individuals as desired. For instance, strong support during the early years of a faculty appointment is extremely important for obtaining independent funding and publications. The scientific director can play an important role in supporting these early years by providing a level of investment that is very different than a formal mentor or chair would typically provide. Furthermore, this targeted approach has the important consideration of being able to support historically minoritized scientists, helping to ensure that all members of the institution have the opportunity to thrive. Where resources permit, the scientific director can lead an in-house team of scientists to collaboratively push these efforts forward.

As an example, we recently piloted a “locum PI” model whereby a member of the scientific director’s team (a scientific manager) met with a faculty member prior to their maternity leave to determine how best to support them over that period. The result was a tailored approach whereby the scientific manager led the usual lab-meeting format to ensure continuity of research and mentoring in the absence of the PI. At the PI’s request, the scientific manager then compiled the presentations, key data, and any arising challenges from all lab members and sent it to her as a single document. The role of the scientific manager in this case was to act as a point person for lab members during the maternity leave period and to inform but not necessarily involve the PI, as per her request. A follow-up anonymous survey of lab members and the PI gave strong positive feedback for the pilot, leading us to consider permanently implementing this model. This example highlights the capacity of the scientific director and their team to go above and beyond the norm in providing strategic, tailored support for faculty, particularly

those at vulnerable points in their career. Under the classical framework—i.e., without this role in place—it would not have been possible to implement this model without placing the burden on another PI, which furthermore runs the risk of creating inequities as well as an uncomfortable dynamic for the trainees.

### **Breadth over depth and a knack for diplomacy**

The position of scientific director requires a particular skillset and experience in order to advance a broad span of research priorities. Expert knowledge of the relevant research discipline is critical to effectively advise and strategize impactful collaborations, grant proposals, and manuscripts. A breadth of knowledge across the relevant discipline—as opposed to depth in any one area—is also important so as to recognize a greater breadth of opportunities and strengths and to better serve all members of the institution equally. The ability to assess scientific impact, recognize and build synergy across teams, and forecast future emerging areas of growth is also key. In many ways, the role and skills required for it are similar to that of a chief scientific officer, only in an academic setting.

We conducted a small web-based survey of 11 participants representing 10 different departments across six US-based institutions in order to gain a deeper understanding of the scientific director role. In this survey, the majority of the respondents had previously worked as an editor at a peer-reviewed journal or similar role prior to becoming scientific director, although others came directly from industry or government. The parallels between the skills required as an editor—expert knowledge across a breadth of research, ability to critically assess science, and strong relationship-building and project management skills—closely mirror those required for the role, which may explain this trend. This is also true for those working as program managers at funding agencies, in science policy, in industry, and in previous similar roles. In these environments, there is ample opportunity to develop critical skills for mentoring junior faculty with regard to their professional development such as effective leading, networking and negotiation,

project management, decision making, effective communication strategies, and so on. These skills are extremely valuable and typically not well taught in academic settings. The scientific director also has a greater bandwidth to think, evaluate, guide, and follow up on what is important to the junior faculty in their professional development and help to navigate this within the landscape of the institution.

It might be possible to intentionally cultivate the role from within an institution through a training or internship process. Because the role interfaces with both the academic community and the public, strong interpersonal skills, collegiality, and diplomacy are extremely important. The scientific director must build trust and rapport with faculty—especially with faculty in senior administrative roles—in order to lead effectively.

### **Developing a sustainable financial model**

Because the scientific director does not perform their own independent research, they cannot support their own salary by obtaining independent funding, as other scientists do. However, alternative models already exist within academia that could allow the creation and support of such a role. Firstly, for the reasons discussed above, we would argue that this role is pivotal to overall performance of a department or institution and the well-being of its members and should therefore be supported by internal funds. There is already a precedent for this in the way that a director for finance and operations is indispensable for directing administrative affairs; and so, it follows that a scientific director is indispensable for directing research affairs. In our experience, the potential gains in institutional funding—whether through research grants, industry engagement, or philanthropic development—can justify the financial outlay. In the previous example of the inter-departmental cross-disciplinary grant proposal led by the scientific director, the total grant amount was over US\$7 million, with a facilities and administrative cost reimbursement of over \$3 million. In a separate example, the scientific director has helped to prepare junior and senior faculty for the final interview presentation stage of several major awards, totaling over \$10 million. In all of these cases,

the lead PIs have reported that they felt the successful award of funding depended on the close partnership with and input from the scientific director. The only caveat here is that seeking to justify the role solely through gains in funding could lead to the prioritization of faculty and projects more likely to be awarded, which has already been shown to be inequitable.<sup>8,12</sup>

One way to support the role is to use central funds from the department. This model requires an understanding from faculty that to support such an endeavor is to support the prosperity of the whole department via improvements in culture, scientific impact, visibility, and prestige. Not all institutions use this model, but for those that do, it is attractive in its sustainability. If internal funds cannot be obtained, however, it may be possible to obtain external funding to support some or all of the scientific director's activities. This is certainly true in the case of training grant administration, as well as investigator-led research where *bona fide* scientific collaboration takes place. Based on the positive outcomes of the role, it is an important investment that institutions can make to support science, mentorship, and training of their faculty. In this way, the role has a multiplying effect, boosting productivity and impact in alignment with the mission of the institute. From a financial perspective, it is also worth considering the culture of positive investment, engagement, and collegiality that the scientific director fosters within the institute, which may protect against potential losses resulting from disenfranchisement, decreased productivity, and failure to retain institutional members.<sup>14</sup>

### Conclusion

Most academic leaders are appointed to provide a vision, serve their constituent members, and advance institutional priorities while also maintaining a world-class research program. The role of scientific

director as leader of a research development team enables this to occur by shaping and executing the scientific mission and providing the capacity to invest and engage with institutional members. This allows the simultaneous advancement of multiple institutional priorities in a way that preserves the vision of the academic leader while protecting their time for research. From an organizational psychology perspective, the success of this model depends on the extent to which both the chair and the scientific director can acknowledge and accept their own limitations and strengths, empowering each other to act with authority in areas where they themselves are deficient.

The major pitfalls of our proposed model include that: (1) it generally lacks acceptance as a bonafide leadership structure and (2) there appears to be little consideration for professional advancement in such roles. Notwithstanding these limitations and given the growing need for proactive investments across many aspects of institutional infrastructure and culture, this complementary leadership framework can ensure that institutions pursue their priorities in a timely manner and that institutional members are well supported in their scientific and professional pursuits.

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### DECLARATION OF INTERESTS

The authors declare no competing interests.

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