

Team Science Scholarship

Contents

Definition	1
Rationale	1
Principles	1
<i>Quality & Impact</i>	2
Domains	2
Criteria	2
Examples.....	3
References.....	4
Acknowledgement	4

Definition

For purposes of the Duke University School of Medicine (SoM) Appointments, Promotion and Tenure (APT) process, team science scholarship is defined as scholarly activity that employs a *collaborative, team-based approach* that leverages disparate competencies and expertise of the members of the team to address a scientific or societal challenge.

Rationale

Over the past century, the reliance on teamwork in nearly all branches of science has increased.^{1,2} This fundamental shift in how research is conducted is likely due to increased specialization of expertise, methods, and conceptual frameworks of the traditional disciplines within the academic institution, and the need to integrate and align activities to address the complex scientific and societal problems we face today.³ While some lines of scientific inquiry and innovation are best suited to a traditional, single-investigator driven model, teams of researchers can draw on diverse skillsets and domains of knowledge, allowing for a more comprehensive approach to studies of highly complex, multifaceted problems. In fact, higher impact publications are more likely to be produced by teams across multiple fields.⁴ As faculty members employ team science by design and participate in team-based effort, there is a need to recognize, measure, and reward contributions via the APT Process. This document articulates a framework for describing team science scholarship contributions within the APT process of the Duke University School of Medicine.

Principles

The foundational principles of team science scholarship align with the SoM values across the spectrum of scholarship. Team science scholarship may be demonstrated in any of the following 4 categories.⁵

- *Discovery* – original research that advances knowledge
- *Integration* – synthesis that brings new insight about information and knowledge across disciplines, across topics within a discipline, or over time

- *Engagement* – application and evaluation of knowledge and expertise applied to consequential problems and societal needs of individuals and institutions
- *Teaching* – systematic study of teaching and learning processes

Quality & Impact

The work cited within the area of team science is defined by the impact of the individual's contributions to the team, and the broader scientific and societal impact of the work. Specific criteria for assessing the individual's impact can be found below.

Domains

There are several domains within team science scholarship that may meet the '*Principles*' outlined above. These include, but are not limited to:

- *Contributions to academic scholarship.* Faculty engaged in team science (herein referred to as team scientists) may contribute to the design, implementation, analysis, and reporting activities of a collaborative project.
- *Contributions to publications.* The intellectual contributions of the team scientist in collaborative reporting activities can be in the overall organization and presentation of manuscripts, preparation of materials, and preparation of rebuttal and resubmission.
- *Contribution to grant applications.* The team scientist may contribute to the design of overall study aims and design, and/or in the preparation of specialist sections.
- *Contribution to programs of research.* Many collaborative research programs span extended periods of time; the team scientist may contribute across a variety of roles within a research program, from the initial study implementation to leadership in the evolution of ongoing research programs.
- *Teaching (inclusive of mentorship).* Outside of formal coursework, the team scientist may cite lectures not associated with an established curriculum, workshops or training programs; the team scientist may also serve as a secondary mentor.
- *Service.* Service on institutional, degree-granting, and oversight committees, as well as service to professional associations and editorial services may also be considered; the unique expertise of the team scientist may be in high demand and thus may represent significant effort.

Criteria

A general framework for the components of team science scholarship for Department and / or Clinical Sciences APT Committee evaluation of a promotion dossier includes the following.

- *Goals.* The overall philosophy and alignment of career goals of the faculty member in terms of team science should be clearly articulated in the Intellectual Development Statement (IDS).
- *Support.* Narrative description of the institutional endorsement of the value of collaborative and interdisciplinary team science should be provided (e.g., this guidance) in the IDS. In addition, candidates should provide narrative and supporting documentation, e.g., a copy of appointment letters or Memorandum of Understanding (MOU) specifying expectations for collaborative and/or interdisciplinary work, and/or FAQ page to address anticipated questions regarding team-based effort.⁶
- *Description.* The faculty member must describe and highlight their role and contribution to team science scholarship. Team science items should describe the nature of the contribution, the degree

to which the individual contributed to this item (major to minor), and narrative text detailing the individual's contribution. Greater value is placed on leadership in idea generation and collaboration, and proactive input.

- *If Interdisciplinary:* Explain the nature of the field and its epistemic community, genres of scholarship, venues of publication and presentation, funding sources, awards, public of stakeholder engagement, and applied and translational activities.
- *External Review Recommendations:* Letters of reference for APT provide critical perspectives regarding the team scientist. Asserting the institutional endorsement of the value of collaborative and interdisciplinary team science in requests sent to referees for letters of reference is highly recommended to ensure that the individual's contributions are clearly communicated for evaluation.

Examples

Suggested impact grid:

Recommended Format for Assessment of Team Science Contributions		
<i>Example activities</i>	<i>Degree of contribution</i>	<i>Detailed description of contribution or activities</i>
Developed and sustained ongoing collaborative interdisciplinary research team	Major	<ul style="list-style-type: none"> - Responsible for determining the need for a team-based approach to address research problem, identifying appropriate collaborators, and initiated the team - Led regular study meetings, including strategies for effective interdisciplinary collaboration - Developed <i>Science of Team Science</i> journal club to review and build on team science literature
Served as PI or Co-PI on externally funded collaborative research	Major	<ul style="list-style-type: none"> - Co-led scientific direction through critical, discipline-specific contributions and the development of the implementation plan
Middle author on Team Science publication	Major	<ul style="list-style-type: none"> - Prepared written material documenting the rationale for a team-based approach including participation in data collection and analysis, summary of results, and the scientific impact of the line of interdisciplinary, and collaborative inquiry
Served as Co-Investigator on externally funded research	Moderate	<ul style="list-style-type: none"> - Contributed substantive discipline-specific input on scientific direction - Oversaw specific discipline-specific aspects of research on externally funded project

Named collaborator on grant application	Moderate	- Contributed substantive discipline-specific expertise to the development of the research aims
Served as subject matter expert on a collaborative, interdisciplinary team	Minor	- Contributed discipline-specific expertise
Invited lecturer to ongoing seminar series	Minor	- Delivered 4, 1-hour lectures on Team Science theory and praxis for audience of K Scholars.

Adapted from Mazumdar et al. ⁷

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