# LSST Interdisciplinary Network for Collaboration and Computing (LINCC): A Hub and Nodes Structure

## Goals

The goals of this document are to define the basic structure of LINCC, highlight its benefits, and outline criteria to become a LINCC institutional node.

## LINCC Overview

LSST Discovery Alliance (the *Alliance*) is addressing the global gap between the resources available for data-intensive astrophysics and those needed for a truly diverse community of researchers to fully exploit the much-anticipated Rubin LSST data. Our answer to this challenge is the LSST Interdisciplinary Network for Collaboration and Computing (LINCC).

The distinctive features of LINCC's integrated suite of programs enable researchers to overcome well-known obstacles in the field of data-intensive astrophysics. Students, early-career, mid-career, and senior researchers can benefit from:

- Access to modern, robust LSST-related analysis tools and data science expertise;
- Astrophysics data-science training for all stages of scientists' careers;
- Innovative financial-support programs; and
- Belonging to a global, inclusive network of well-connected interdisciplinary scholars interested in Rubin LSST.

## LINCC Organizational Structure

*A **hub** is the effective center of an activity, region, or network. A **node** is a point at which lines or pathways intersect or branch; a central or connecting point.*

**LSST Discovery Alliance is the central hub and driving force of LINCC**, overseeing the successful implementation of a thriving and connected network of nodes, activities, programs, and researchers. All Alliance members benefit from LSST-DA serving as the hub of LINCC activities on their behalf, ensuring that members contribute to and receive priority access to LINCC programs, and establishing an effective and responsive LINCC governance structure.

**Some Alliance member institutions are LINCC nodes**, delivering key programs and serving as centers of LSST-related intellectual exchange for the benefit of the broad Rubin community. Carnegie Mellon, Northwestern, University of Arizona, and University of Washington are the four founding LINCC nodes. LINCC nodes are uniquely positioned to develop, share, and/or

deliver resources for the international LSST research community. LSST-DA will partner with several provisional node institutions (or consortia) to pursue the funding needed to implement LSST-related programs those institutions seek to deliver, or to shape existing resources at those institutions into LINCC programs.

**All Alliance member institutions are part of the LINCC fabric** and will be invited to participate in decision making related to the selection of LINCC node programs as well as to contribute ideas and expertise to the success of LINCC.

This LINCC structure is designed to benefit all member institutions, the node institutions, and the Alliance as a whole by providing high visibility, major impact, and funding appeal for the Alliance and our members. The Alliance website will feature content on each node institution, with descriptions of their LSST community-serving program(s) and how the broad Rubin community can engage with them.

## Criteria for and Examples of Possible Future LINCC Nodes

The structure described above provides a framework for Alliance members to request node status:

1) through the description[1] of a project or program that can be delivered using existing resources at the institution (e.g., existing funded programs, activities, or other resources that can be woven into LINCC without additional fundraising); or
2) through the description of a compelling future role that the Alliance member institution or consortia would like to take on if external funds can be successfully obtained (*provisional node* status for up to two years or until funding is secured).

Criteria for selection as a node[2]:

- **A compelling idea for a program** (whether already funded or in need of funding) that would be highly valuable for the LSST research community, with a 3-5 year budget in the range of about $1M to $15M, and a clear fit within the overall LINCC landscape. If external funds are needed, the program must be attractive to potential funders. Program ideas should ideally be developed in consultation with Alliance members, LSST Science Collaborations, Rubin Observatory personnel, Alliance leadership, and/or current LINCC node institutions. Programs should align with the Alliance's mission, values, and unique strengths; they should be inclusive and valuable to the broad Rubin research community. Programs must also provide concrete, additional benefits to researchers at Alliance member institutions. For example, the Catalyst Fellowship and

[1] Instructions for requesting for node status are provided in a companion document.
[2] Node institutions may partner with a supporting member institution to deliver their program, e.g., as CMU partners with University of Pittsburgh as a node delivering LINCC Frameworks.

LINCC Frameworks programs offer inclusive access as well as member benefits: Catalyst Fellowships are open to applicants from any institution while host institutions are limited primarily to Alliance members. Frameworks Incubators are open to any researchers, with a specific fraction to be awarded to teams led by researchers from Alliance member institutions.

- **A local team of faculty or senior researchers** who are committed to: 1) working closely with the Alliance for up to two years to secure funding for the project idea; 2) making the project once funded a successful, well-integrated part of LINCC; and 3) participating actively in the on-going development of LINCC as a whole.
- **Institutional strength** in a scientific or technical area that complements the expertise at existing LINCC nodes, ideally along with an institutional record of community-mindedness (such as successful participation in past multi-institutional partnerships or Alliance initiatives). The Alliance also seeks new nodes or provisional nodes whose geographical location or institutional type complements the features of existing nodes.
- **Internal institutional resources** such as office space, personnel, computing resources, and/or matching funds, to demonstrate ongoing institutional investment in LINCC and the success of the proposed program. The four founding nodes offered matching contributions valued at a total of ~$10M in the original LINCC pitch documents.

Example ideas for future LINCC nodes:

- **Software node (e.g., CMU and UW)** – Create and share software analysis tools of broad relevance to key LSST science goals.
- **Computing resource node** – Provide computing resources for Rubin LSST code development or science calculations, including expert personnel to help astrophysicists effectively utilize those resources.
- **Data Science/AI node** - Provide collaborative data science or AI expertise to astrophysicists in support of their Rubin LSST research.
- **Training node** - Deliver a major or on-going LSST- or big-data-focused training program for students or researchers at other career stages.
- **Community engagement node -** Deliver a suite of community-engagement activities that contribute to Rubin LSST (early) science, network building, and/or Rubin LSST scientific career pathways.
- **Example six** - Your idea here.

Faculty, staff, and students at Alliance member institutions can find this document and the companion document, “Call for Expressions of Interest in Participating in the Expansion of LINCC,” online through the Institutional and Board Members Portal of the LSST-DA website, in the Proposal Opportunities section.