

Scientific Life

The transition phase: preparing to launch a laboratory

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The process of starting a laboratory varies between institutions. However, there are universal tasks all investigators will need to address when launching their laboratories. In this piece, we provide a brief summary of considerations for incoming group leaders to centralize this information for the scientific community.

Introduction

The manifold considerations that go into establishing a laboratory can be esoteric and overwhelming. In this article, we describe specific tasks that can be completed before your start date or upon arrival. We have chosen to focus on group leaders at research-intensive universities in biomedical research in the USA. While we recognize that these guidelines are not exhaustive and will ultimately be different for every group, our goal is to provide a framework that can be used by incoming group leaders to orient themselves during the transition process. While other excellent resources exist that describe guidelines for setting up a laboratory [1], we aim to debrief this information from the standpoint of newly hired faculty members. We detail items for specific action that rising faculty can undertake and consider during their transition to their new positions as group leaders.

Before you arrive

While you may not have significant time to prepare for the transition to faculty

member, prioritizing certain tasks can save months of time upon arrival (Figure 1 and Table 1). First, we recommend obtaining a non-employee affiliation with your new institution to allow you to complete tasks that require login access or an institutional e-mail address. With your institutional affiliation, you may be able to complete trainings on safety, ethics, and sexual harassment prevention ahead of time. Importantly, you can create and submit applications to the Institutional Biosafety Committee (IBC), the Institutional Animal Care and Use Committee (IACUC) for those working with vertebrate animals, and/or the Institutional Review Board (IRB) for studies with human subjects. These applications require specific experimental details and can take weeks to draft and several months and rounds of revisions before approval. Similarly, creating a chemical inventory, compiling relevant information on hazardous chemicals, and submitting radiation safety applications (which can take 6+ months to be approved due to comprehensive background checks) can also be done before formally starting your position. By completing these tasks ahead of your start date, you will accelerate the time to the first experiment.

Additionally, during the pandemic, there have been severe delays in supply chains, resulting in back-ordered supplies and equipment. We recommend creating an equipment list and contacting vendors about pricing and estimated lead times for important items. It is helpful to document the catalog numbers of items you use regularly in your current laboratory to facilitate future ordering. Making a list of major vendors, sales representatives, and relevant new group leader discounts can save you time and money. You can request that your institution set up your startup purchasing account before your arrival so that you can place orders for important equipment and back-ordered items before starting. You can also work with vendors to schedule deliveries after your arrival, if needed. Logistically, you

will want to stay in close contact with whoever is assisting with your laboratory space to ensure that renovations are completed accurately and within the time frame provided. Towards this last point, identifying the right person with whom to discuss these operational tasks and preparations can be challenging when you are not 'on the ground'. Request a list of the relevant staff (sometimes called an organizational chart) to help you identify the person most likely to be appropriate for each request. Anything outlined above can also be done upon arrival, and this may be preferred by the group leader.

Consider other important tasks you can complete before arriving, including coordinating shipment of materials from your current institution (mice, plasmids), deciding on an inventory system (for reagents, strains, plasmids, etc.), trying out and selecting a laboratory notebook system, writing standard operating procedures and frequent-use protocols, and writing a laboratory manual (discussed in more detail below). Finally, if you plan to transfer any grants, we recommend connecting with the grants offices from both institutions to facilitate the closeout, relinquishment, and transfer of awards. This process can take a few months, so we recommend planning ahead. You may also be eligible to submit certain new faculty grants before you officially start your position, if you will have started your position at the time of award.

Beyond these tasks, it is important to note that recruiting laboratory personnel takes time. Ahead of your arrival, we suggest that you work with your institution or independently to create a laboratory website. Curating your research vision and laboratory philosophy serves as a valuable recruitment tool. Departmental human resources staff can help you develop and post any positions you plan to fill. This involves writing the advertisement (what are the required skills for the person you need?, when would you like this person

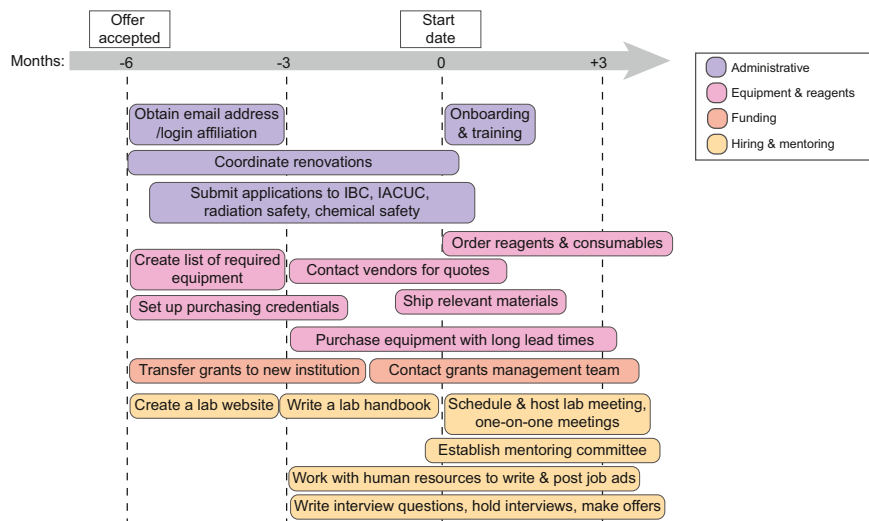


Figure 1. Suggested timeline for critical tasks for incoming group leaders. At the top, we depict an idealized timeline for initiating and completing key tasks necessary for setting up a laboratory. Below, we highlight important action items that incoming/new group leaders can use to guide their transition phase and initial period of group leadership and include a legend categorizing each task type using colors. Abbreviations: IBC, Institutional Biosafety Committee; IACUC, Institutional Animal Care and Use Committee.

to start?) and gathering information about salary, benefits, and funding opportunities for prospective laboratory members. Once your position has been advertised, you can develop a list of interview questions to guide your interactions with candidates. This will streamline the interview process and curb implicit bias during decision-making so you can hire individuals to help you soon after your start date.

Finally, consider investing in yourself and others. Your first-hand and recent experience from the job search (interview formats, the mechanics of the chalk talk, and common questions) will allow you to give invaluable advice to the next group of postdoctoral researchers at your institution or in your network. You can also take this time to reflect on your values and goals before starting your new position.

Upon arrival

A key goal for the early stages after arrival is to identify and build a support structure (Table 1). Your institution may assign you a faculty mentor or a mentoring committee, or you may choose to build one or

supplement your assigned committee. These individuals can serve as a first point of contact for feedback on grants, papers, and mentoring, as well as provide candid feedback on your progress towards promotion. You may choose to write a grant soon after arrival, which can provide a concrete project on which to focus your initial conversations with your faculty mentor or to help you evaluate potential mentors. This will also allow you to familiarize yourself with the grant submission procedure at your new institution.

In addition to your assigned mentors, we recommend that you seek advice from other faculty in your department, particularly other recent hires. Many of the specific details about running a laboratory involve navigating idiosyncrasies of your local environment, and you do not need to rediscover these idiosyncrasies for yourself. Finally, one of the challenges of starting a new laboratory is that many of the people designated to help you, such as senior faculty in your department, are also ultimately responsible for evaluating you. We recommend that you seek to

build a support network that is external to your local environment (e.g., department) with whom you can fully let down your guard and blow off steam. This may be a group of new investigators in other departments at your institution or nearby institutions, or you may build communities with other investigators in virtual spaces.

If your institution has a graduate program, recruiting graduate students may be high on your agenda. We recommend that you take every available opportunity to make yourself visible to graduate students, such as opportunities to present your research to students and social events coordinated by the graduate programs. For some research centers, you may need to establish your affiliation with another institution to be able to officially mentor graduate students or have your students apply for specific training grants. We recommend connecting with the relevant individuals in charge of graduate education to facilitate these affiliations.

Now is also a good time to establish work practices for yourself and your laboratory members. How will your laboratory members place orders? What are your expectations for keeping a laboratory notebook? How will you distribute laboratory responsibilities? We have found that writing a laboratory manual or expectations document can help you consider the policies you want to implement in your laboratory (do you want to lay out expectations of work hours and vacations?, how do you want people to communicate with you?). A laboratory manual can also simplify the process of onboarding your recruits, avoid miscommunication, and assure equity within your laboratory.

You will also start to formulate schedules and structures for laboratory meetings. When your laboratory is small, you may find it helpful to have a joint group meeting with another laboratory with whom you have overlapping scientific interests.

Table 1. Transition action items and corresponding resources/considerations

Action item	Resources and considerations
Administrative	
Obtain an institutional e-mail and/or electronic credentials	Contact department administrator and/or information technology
Obtain an organizational ('org') chart to identify relevant contacts	Ask your department administrator
Get listed on your department's faculty webpage	Link to your laboratory website
Safety	
Introduce yourself to relevant safety personnel; identify required forms	Find contacts on the Environmental Health and Safety (EH&S) website. Many EH&S sites have a new PI checklist for getting started that you can find by searching
Submit Institutional Biosafety Committee (IBC) application	Contact institutional Biosafety Officer (EH&S) for instructions and clarification
Submit Institutional Animal Care and Use Committee (IACUC) protocol application	Contact Institutional Review Office, Husbandry Operations Management team to discuss process, clarify any considerations, discuss procedures. If possible, request a copy of the protocol from a laboratory with similar interests
Submit IRB protocol application	Contact the campus IRB office
Submit Material Transfer Agreements (MTAs)	Contact MTA officer for your institution and any institution from which you need materials (including your current laboratory, e.g., transgenic mice, plasmids, etc.)
Create chemical and carcinogen safety plans	Contact institutional Industrial Hygienist or Chemical Hygiene Officer (EH&S)
Complete radiation use authorization application	Contact institutional Radiation Safety Officer (EH&S)
Complete required trainings (biosafety, conflict of interest, sexual harassment prevention, etc.)	Contact department administrator for instructions
Renovations	
Contact renovation project manager to discuss requirements	What kind of special equipment will you have?
Obtain laboratory blueprints	Contact building/floor manager or administrators
Create initial large equipment list according to the needs of your laboratory	Does your equipment have special power, gas, vacuum requirements?
Purchasing and supply management	
Access your startup funds	Identify restrictions on spending prior to start date (e.g., can you only buy equipment and not consumables?)
Make a list of local sales representatives	Many companies give new PI startup discounts
Contact sales representatives for major equipment	Obtain quotes for items; ensure that expiration dates align with your purchasing timeline
Identify shared departmental equipment	Send list of desired equipment to floor/building manager or administrators
Identify other sources for gently used equipment and supplies	For example, eBay, closing laboratories, auctions, institution surplus, National Institutes of Health (NIH) surplus, Copia Scientific
Identify preferred vendors for your institution	Does your department have access to a storeroom with reduced prices?
Obtain training on how to use institutional/departmental ordering system	Discuss ordering system and training requirements with administrative staff
Investigate shipping options for materials you will bring from your former institution	For example, plasmids, mice
Set up an inventory management system for your laboratory	For example, Quatz, GenoFab
Determine how you and your department will track spending, how often reports are generated	For example, Spendlab.org
Recruiting and hiring	
Identify what kind of expertise you want to have in your laboratory initially	Do you want a research assistant to help you set up the lab? Do you want to have postdoctoral fellows? When will graduate students join?
Reach out to hiring personnel about different types of positions/classifications for staff; determine salary, benefit, fringe costs	Contact Human Resources directly to discuss recruitment and hiring procedures
Post job advertisements for relevant positions	Advertise on social media, at conferences, on JobRXiv, and through your network
Interact with affiliated graduate programs	Contact graduate program or graduate training leadership

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Table 1. (continued)

Action item	Resources and considerations
Determine whether you want to be affiliated with other departments/graduate programs/centers at your institution to recruit graduate students	
Make a standardized interview question set for each type of position in your laboratory	For example, a set of questions for postdoctoral candidates, rotation students, research technicians, undergraduate students, and staff scientists; consider designing questions for screener interviews or phone interviews and for full interviews
Laboratory promotion	
Make a laboratory website	Work with your institution to design and host a website, or design your own (e.g., with Wix, SquareSpace, GitHub, etc.)
Design a laboratory logo	Utilize Fiverr or 99design for professional graphic design
Make a laboratory or professional Twitter account (if desired)	
Update your professional headshot	Does your institution have requirements for this? Is there an onsite headshot studio?
Laboratory management	
Decide on a structure and frequency for your laboratory meeting	Will you join another laboratory's meeting initially? What kind of presentations will your trainees give (e.g., full presentation, short updates, journal clubs)?
Decide how frequently you will meet with your trainees and the structure of these meetings	How will you communicate expectations for these meetings?
Make a laboratory expectations document/laboratory manual to help with onboarding and set clear expectations for working in your laboratory	
Read books about management	For example, HHMI's <i>Making the Right Moves</i> ; <i>Lab Dynamics</i> by Carl Cohen and Suzanne Cohen; <i>At the Helm</i> by Kathy Barker; <i>The Making of a Manager: What to Do When Everyone Looks to You</i> by Julie Zhuo
Choose and set up a system for laboratory notebooks	Many laboratories use electronic laboratory notebook (ELN) software (e.g., Benchling, LabArchives, SciNote)
Choose and set up a system for plasmid/cell line/etc. management	For example, StrainControl, LabSuit, Benchling Registry
Designate a space for intralaboratory communication	For example, Slack, Discord, Teams, e-mail
Set up booking systems for major laboratory equipment	For example, Google Calendar, Bookkit
Funding	
Transfer transition awards or grants to new institution	For example, R00, K01 awards
Identify your Sponsored Projects Office representative	What is the typical timeline for internal review prior to submission?
Identify early career awards in your field and eligibility requirements	You can apply for some awards before your official start date
Familiarize yourself with common federal [NIH/National Science Foundation (NSF)] funding mechanisms; ask colleagues for successful examples of grants	Understand the differences (preliminary data, length of research statement, goals, budget, effect on Early Stage Investigator status) between common funding mechanisms submitted by new PIs [NIH R01, R21, National Institute of General Medical Sciences Maximizing Investigators' Research Award (MIRA) (R35), NIH Director's New Innovator Award Program (DP2); NSF Standard versus Early-concept Grants for Exploratory Research (EAGER)]. Which NIH institute (and study section) will you submit to?
Mentoring and support	
Identify who will be on your departmental mentoring committee	How often will the committee meet? What is their role?
Build a network of peers outside your department	Are there virtual spaces in your field (e.g., New PI Slack, institution-specific New PI groups) or groups you can join? If not already established, can you create one?
Take a laboratory management/leadership course	For example, European Molecular Biology Organization Laboratory Leadership course, Cold Spring Harbor Laboratory Leadership Course

Alternatively, you may use some of your early laboratory meetings to give 'workshops' on information that you believe is key to help your laboratory members work rigorously and efficiently (e.g., an

overview of mouse genetics, or how to handle imaging data). In the age of Zoom, it is straightforward to record these workshops, so that new members can watch them at their convenience.

To close, some practical advice: buy a toolbox, box cutter, and laboratory cart right away. You will have a lot of new toys to open, assemble, and move around! Finally, be kind to yourself. This transition

is both exhilarating and challenging, and will upend even the best-laid plans at times. Trust the people who hired you and the mentors who have supported you: they know you can do this!

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