



RESEARCH MANAGEMENT

BY CAROL SMIDTS

DEPARTMENT OF MECHANICAL AND AEROSPACE ENGINEERING
THE OHIO STATE UNIVERSITY

I. LEADERSHIP

Leadership is the combination of:

Vision

Relationships

Tasks

CREATING A VISION

Starts with a mission statement that includes:

- Type of research you want to do
- Motivation for your research
- Atmosphere in which you want to work

DEVELOPING YOUR LEADERSHIP STYLE

Practice using different styles of leadership

Different styles are required for different situations and people

There are *four* leadership styles:

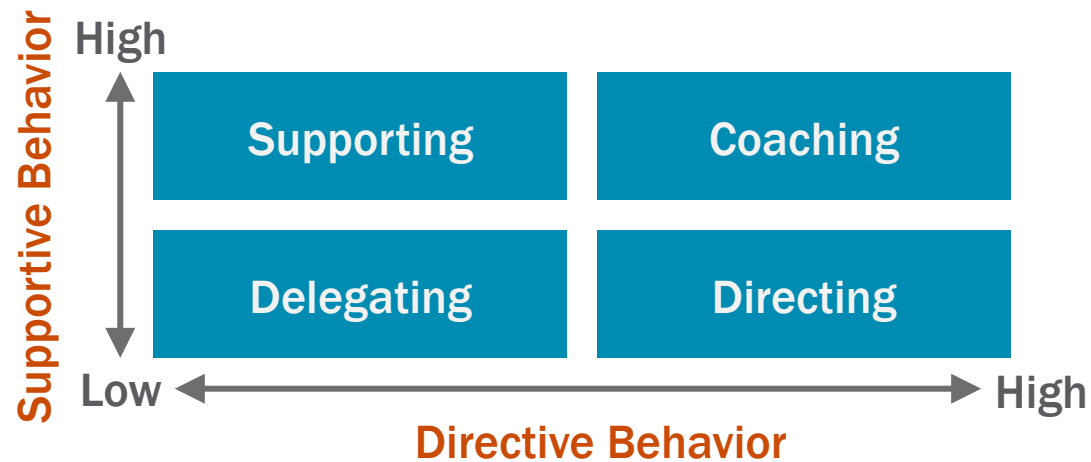


Image Source: Adapted from *Making the Right Moves*, The Howard Hughes Medical Institute and Burroughs Wellcome Fund.

BUILDING AND SUSTAINING AN EFFECTIVE TEAM

- There is a **99.999%** chance that you will work with a team — *large or small*
- Every team is different
- Some rules for maintaining effective teams apply to **ALL** teams:
 - Maintain contact
 - Walk around the lab once a day
 - Have group meetings
 - Have one-on-one meetings
 - Hold performance reviews
 - Hold performance reviews
 - Small group meetings
 - Strategy sessions
 - Journal club meetings
 - Informal group activities

GIVING AND RECEIVING FEEDBACK

Giving and receiving feedback is a *critical leadership skill*

GIVING

- Give feedback to your students/postdocs on a regular basis
- Make your feedback objective

RECEIVING

- Get feedback from your students and colleagues (department chair and senior colleagues)

MAKING DECISIONS

- As a PI, you will make **HUNDREDS OF DECISIONS** per day
- There are various styles of decision making appropriate to your personality and the time constraints of the situation:
 - Make the decision *on your own*
 - Make the decision *by consulting a few individuals*
 - Make the decision *with the group*
 - *Pass the decision* to others

SETTING AND COMMUNICATING RULES OF BEHAVIOR

- Set expectations **EARLY** and **CONTINUOUSLY**
- Set expectations on:
 - **WORK HOURS** — Difficult to specify; typically modeled after your own
 - **PROLONGED ABSENCES** — Ask you students to provide several weeks notice
 - **PAPER AUTHORSHIP**
 - **ETHICS** — Live by them and talk about them
 - **PROJECT OWNERSHIP** — Sufficiently separate and interrelated
 - Policy about letting projects go with a post-doc when he or she leaves

MOTIVATING LAB MEMBERS

- It is **YOUR RESPONSIBILITY**
- Enhance motivation through:
 - The ability to make choices
 - The competence to do the assigned tasks
 - A purpose
 - Recognition
 - Feeling comfortable
 - Making progress
 - Sharing your enthusiasm

MANAGING CONFLICT IN THE LAB

Five modalities of conflict resolution from the *Thomas-Kilmann Conflict Model*:

COMPETING — Is an assertive and uncooperative approach to handling conflicts

ACCOMMODATING — Is an unassertive and cooperative approach

AVOIDING — Is an unassertive and uncooperative approach

COLLABORATING — Is an assertive and collaborative approach

COMPROMISING — Is somewhere in the middle between assertive and collaborative

II. STAFFING YOUR RESEARCH GROUP

- Staffing your research group with the right people is extremely important and a key contribution to your success
- Know the difference between employees and students
 - Post-docs and technicians are **EMPLOYEES** (hired and fired)
 - Undergrads and grad students are **STUDENTS** (assigned and released)
- Avoid discrimination
- Determine your staffing needs
- Do not rush into hiring
- Write the job description

RECRUITING APPLICANTS: **GET THE WORD OUT**

INFORMAL METHODS

- Word-of-mouth
- Statement on your website
- Students you meet at conferences
- In your classes

FORMAL METHODS

- Place ads in journals
- Your society websites

RECRUITING APPLICANTS: **WHAT DO YOU HAVE TO OFFER?**

- Promote your vision
- Communicate your lab culture
- Communicate your commitment to mentoring
- Offer flexibility where you can
- Provide a reasonable degree of assurance with respect to the stability of funding

WHAT THEY ARE LOOKING FOR

TECHNICIANS

- Work closely with a PI, be included on publications, learn new techniques

GRADUATE STUDENTS

- Work closely with the PI

UNDERGRADUATE STUDENTS

- Curious about research, looking for funding, recommendation letters

POST-DOCS

- Most post-docs are typically attracted to established labs
- However, a policy for letting projects go with the post-doc may be an attractive proposition

SCREENING APPLICANTS

TIPS FOR SPECIFIC POSITIONS

- For *post-doc positions*, look for applicants with at least two journal publications for which they are first author; look at *quality* of publications not just *quantity*
- For a *technician* with a record of publications, check carefully whether they contributed intellectually to the research; check the references
- For a *graduate student*, talk with those who know him or her and remember a high GPA is not directly indicative of success in research

CHECK REFERENCES DIRECTLY

- Contact them by phone (use open-ended questions)
- Check **ALL** References

INTERVIEWING APPLICANTS

- **Based on phone interviews, narrow down list of prospects and invite them to visit your lab**
- **They should meet with you, members of your lab, some colleagues**
- **For post-docs, ask them to give a seminar**
- **Conduct a structured interview which is identical for all applicants**
- **Avoid topics such as race, color, sexual orientation, family status, etc.**
- **Develop interview questions that map to the position statement and evaluate attributes of the position statement**
- **Questions should cover: Experience and skills; Commitment and Initiative (Why do want to work here?), Working and Learning Styles, Time Management, Decision Making and Problem Solving, Interpersonal Skills**

EVALUATING APPLICANTS

- Attempt to be **OBJECTIVE**
For example, avoid the “halo effect,” consider the time of day
- What should you be looking for?
A “good fit,” passionate, research, ethics, etc.
- ***Watch for Red Flags!***
For example, anger, avoiding eye contact, criticizing others, avoiding responsibility, etc.

MAKING THE OFFER

- Inform all applicants (starting with the person to whom you wish to make the offer and then those you did not get the position)
- After discussing the terms on the phone, the offer letter should follow

ASKING SOMEONE TO LEAVE

- Sometimes you may have to dismiss someone in the group
- Be fair and **PROVIDE ADVANCE WARNING**
- Make your expectations clear and keep track of your efforts in guiding your personnel to meet these expectations
- **WARN** your employee/student/post-doc and **DEVELOP A REMEDIAL PLAN** with milestones and deliverables
- If you decide to terminate, first ensure warning was given, the person was treated fairly, and adequate training was provided
- To terminate, check with HR but this will involve a termination meeting, keep notes, be cordial and to the point, try to part in good terms
- You may be asked to write a termination letter and to provide a reference

III. MENTORING

- Mentoring is a one-to-one relationship between an experienced scientist and a less experienced scientist or a scientist-in-the-making
- Those you mentor will carry your scientific legacy
- What are the traits of a good mentor?
 - Accessibility
 - Empathy
 - Open-mindedness
 - Consistency
 - Honesty
 - Patience
 - Savviness
- You should treat the information you receive as confidential

WHOM TO MENTOR

- Whom to mentor should be determined on a **CASE-BY-CASE** basis
 - Your research group members are your responsibility
 - You also have some responsibility to students in your class
 - For all others it is your decision

MENTOR VS. ADVISER

A mentor provides what is necessary to the further development of the person being mentored

According to the *Council of Graduate Schools*, a mentor is a:

ADVISER — A person sharing technical knowledge and experience

SUPPORTER — A person providing emotional and moral support

TUTOR — A person who provides feedback on performance

MASTER — A person with whom one is in apprenticeship

MODEL OF IDENTITY — The type of person to be to be an academic

It is likely that you cannot fulfill all these roles and the person being mentored may look for multiple individuals to satisfy all roles

STRATEGIES FOR EFFECTIVE MENTORING

- Make everything a learning opportunity
- Set *specific goals and measures of accomplishment*
For example, publication goals
- Encourage *strategic thinking* and *creativity*
Explain your strategic decisions — let them theorize and hypothesize first
- Uphold *high standards* for yourself and others
Includes time management and data logs
- Clearly state expectations

STRATEGIES FOR EFFECTIVE MENTORING

- *Impart skills*
Involve everyone in writing grants and papers; give them management responsibilities in the lab or in class
- *Provide networking opportunities*
Allow your students to meet seminar speakers; take them to conferences; have them approach your colleagues using you name; present at meetings
- *Provide moral support*
You have a commitment to help

DIFFERENT MENTORING NEEDS

- Everyone in your research group has a different career path and mentoring needs
- Research begins with undergraduates
 - Have them supervised by a graduate student or a post-doc
 - Closely monitor their work and progress

DIFFERENT MENTORING NEEDS: GRADUATE STUDENTS

While undergraduates acquire knowledge from existing material, graduate students create new knowledge

IN THE BEGINNING...

Provide a coherent study plan that leads to a choice of thesis

IN THE MIDDLE...

Help students when he or she is stuck through moral support and technical advice. The student starts sharing his/her knowledge with others.

TOWARDS THE END...

The student is getting ready to leave. You will be asked for letters of recommendation and other members of the committee may be asked as well. They may look for a post-doc position.

DIFFERENT MENTORING NEEDS

POST-DOCS

Post-doctoral fellows are in transition to becoming real professionals

- Treat them as colleagues
- Help them develop one particular project that they will be able to take with them on which you will not compete for awhile
- Help them in their job finding
- If they are unhappy, help them quickly find another position

TECHNICIANS

Technicians are part of your technical staff

- If they are interested, give them their own research projects
- If not, they may be interested in growing their technical skills

HOW TO GET THE MENTORING YOU NEED

- Mentoring is a way to receive additional support.
- Can enlarge your network and provide an extra set of eyes
- Possible mentors include:
 - Your old mentors (PhD and post-doc advisers)
 - Mentors formally assigned by the department
 - Mentors from the department which you may seek informally
 - Confidants
- Bring *foresight, proactivity, respect, and reciprocity* to the relationship between you and your mentor

IV. COLLABORATIONS

- **Today's research is often collaborative**
- **Collaborators have a shared interest in the success of the research project**
- **Do not confuse them with service providers**
- **Collaborations can be short or long**
- **Collaborations can include a single collaborator or a large number of researchers**

SHOULD YOU COLLABORATE?

- Because a collaboration will require time and effort, you must first assess the need for collaboration
 - Is there a missing component to your research that needs to be filled?
 - Will you be able to collaborate efficiently given distances and other degrees of separation?
 - Can you trust your potential collaborator?

SETTING UP A COLLABORATION

As a junior faculty, you are likely the one to be initiating the collaboration

- How should you initiate?
 - Define an outline for your proposal
 - Send an email first with a high-level description of your research idea
 - Be informed. Know your collaborator's background and which role each of you might play
 - This will lead to phone conversations and possibly a trip to your collaborators' location

SETTING UP A COLLABORATION

- Next, define a collaboration agreement
- For a collaboration between two universities, an informal agreement can be used which outlines:
 - The purpose of the collaboration
 - The scope of the work
 - Expected contribution
 - Financial responsibilities
 - Milestones
 - Reporting obligations
 - Expectations of authorship
- If the collaboration involves a commercial entity, a formal agreement may be necessary (publications and patent rights would be an additional portion of such an agreement)

THE INGREDIENTS OF A SUCCESSFUL COLLABORATION

- Keep the lines of communication open
 - Establish meetings with clear agendas and well-defined dispositions
 - Maintain deadlines or renegotiate them if necessary
- Authorship and intellectual property issues
 - Important for you and your students
 - Discuss early and revisit when publication deadlines approach
- If work is patentable:
 - Introduce your patent disclosure **BEFORE** you disclose the work
 - You will need to deal with the concept of “joint intellectual property”

SPECIAL CHALLENGES FOR BEGINNING INVESTIGATORS

- **Make your contribution clear — It can be difficult to get the credit you deserve when collaborating with senior, well-established researchers**
- **The larger your collaborator's research group, the more difficult it will be to renegotiate first or last authorship**
- **Do not become diluted — If you have special technical knowledge, you may be requested to collaborate on many joint projects**
- **If you engage in multiple collaborations, you may end with conflicts of interest**

INTERNATIONAL COLLABORATIONS

For international collaborations, ask yourself, “Will it be worth the effort?”

- What are the language differences?
- What are the cultural differences?
- How significant are the distances? What travel is entailed?
- What is their practice of publication and authorship?
- What is their research infrastructure?

To work well, you need:

- A stable source of funding
- A committed collaborator at the other end

WHEN A COLLABORATION IS NOT WORKING

- Collaborations can fail for many reasons
 - A collaborator may become ill
 - A collaborator may move
 - Results are not forthcoming
 - There is honest disagreement between parties
 - One or both parties behaves badly (disparaging the other)
- If this happens, have a straightforward discussion with your collaborator
- If this does not work, let it go but do not advertise it. Do not be discouraged.
- Collaborations can help take your research in new directions, and can help your visibility, can help recruit graduate students and post-docs, can help for letters

THANK YOU FOR YOUR ATTENTION!

QUESTIONS?