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Research Team Leadership:

Focus on Graduate Students

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The winner is…..

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The winner is…..

Sir J. Fraser Stoddart

Jean-Pierre Sauvage

Bernard L. Feringa

"for the design and synthesis of molecular machines"

Nobel Prize in Chemistry 2016

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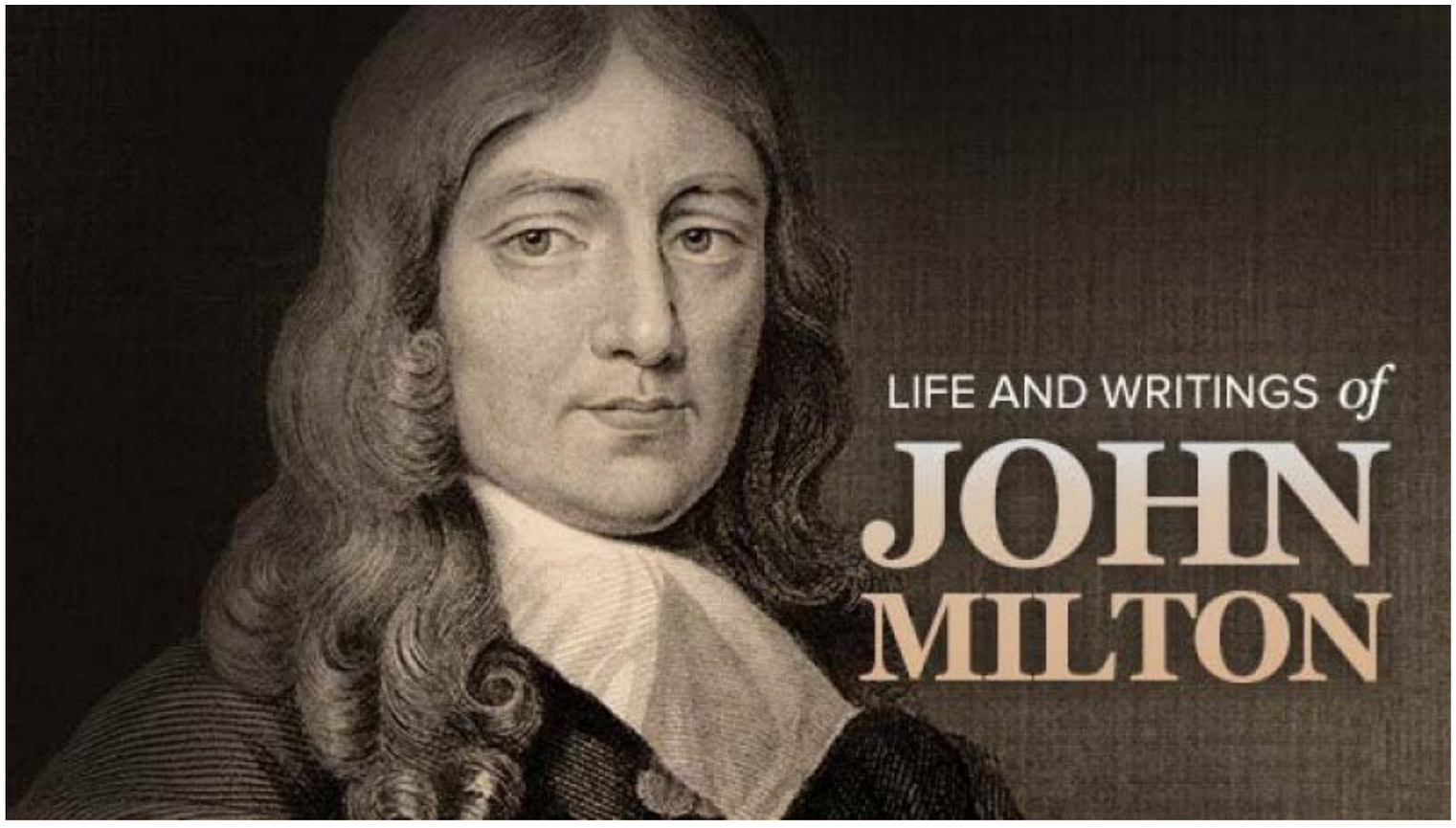
John Milton Knowledge problem



- In today's world it is impossible to know everything
- About 130,000 articles published with chemistry in the title 2018

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Wisdom of Crowds

Criteria	Description
Diversity of opinion	Each person should have private information even if it's just an eccentric interpretation of the known facts.
Independence	People's opinions aren't determined by the opinions of those around them.
Decentralization	People are able to specialize and draw on local knowledge.
Aggregation	Some mechanism exists for turning private judgements into a collective decision.
Trust	Each person trusts the collective group to be fair.

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Who might be on your team?

You

Other faculty *(here at UC or elsewhere)*
Staff *(departmental or in your group)*
Undergraduate students
Graduate students
Post-doctoral fellows

We would like to help you think about how to deal with this heterogenous group

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What are the minimal characteristics of a good team?

- Everyone knows their role and responsibilities
- The group meets regularly to share information
- Everyone is professional (courteous and considerate)
  - E.g. No one slows anyone else down by leaving a mess in the lab

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What are the desired characteristics of a good team?

- Everyone is invested in success
- Everyone is engaged
- Communications among team members occur spontaneously and frequently
- Constructive criticism is expected and welcomed
- Personalities and ambitions synergize to make a fun environment

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What does the team leader need to do to support the team?

- Empower and inform those on the team
- Be inclusive in discussing new ideas and approaches
- Keep everyone in their lanes *(avoid mixing/diluting responsibilities)*
- Keep expectations on track
- Keep everyone equally accountable *(no favorites)*
- Learn what motivates each individual on the team

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What attitudes should the team leader emphasize?

It depends on the strengths and weaknesses of your team, and their motivational basis

- **Excellence?**
- **Speed?**
- **Fame?**

You might have to emphasize different themes to optimize progress, so here are some examples….

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What attitudes should the team leader emphasize?

These could be of higher importance when the motivator is "speed" and you have to combat the sloppiness that comes with rushing…

- Safety is more important than progress
- Thinking saves time
- Progress requires careful notes, proven reproducibility, and systematic advancement
- Mistakes are fine, but you must learn from them and move on

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What attitudes should the team leader emphasize?

Or if the motivator is "fame" or "excellence"…

- Everything should be shared among team members (data, equipment, ideas, credit)

- Sharing your results with other team members is the best way to think through the meaning of outcomes and get new ideas

- High expectations should be more exciting than stressful

- Imperfect experimental outcomes are the tool that leads to better experimental design

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Special concerns for trainees on the team

- Less confident and less experienced
- More likely to get stuck in between two conflicting opinions/ideas/people
- Need help/advice on navigating between team members
- Need advice on hierarchy and communications

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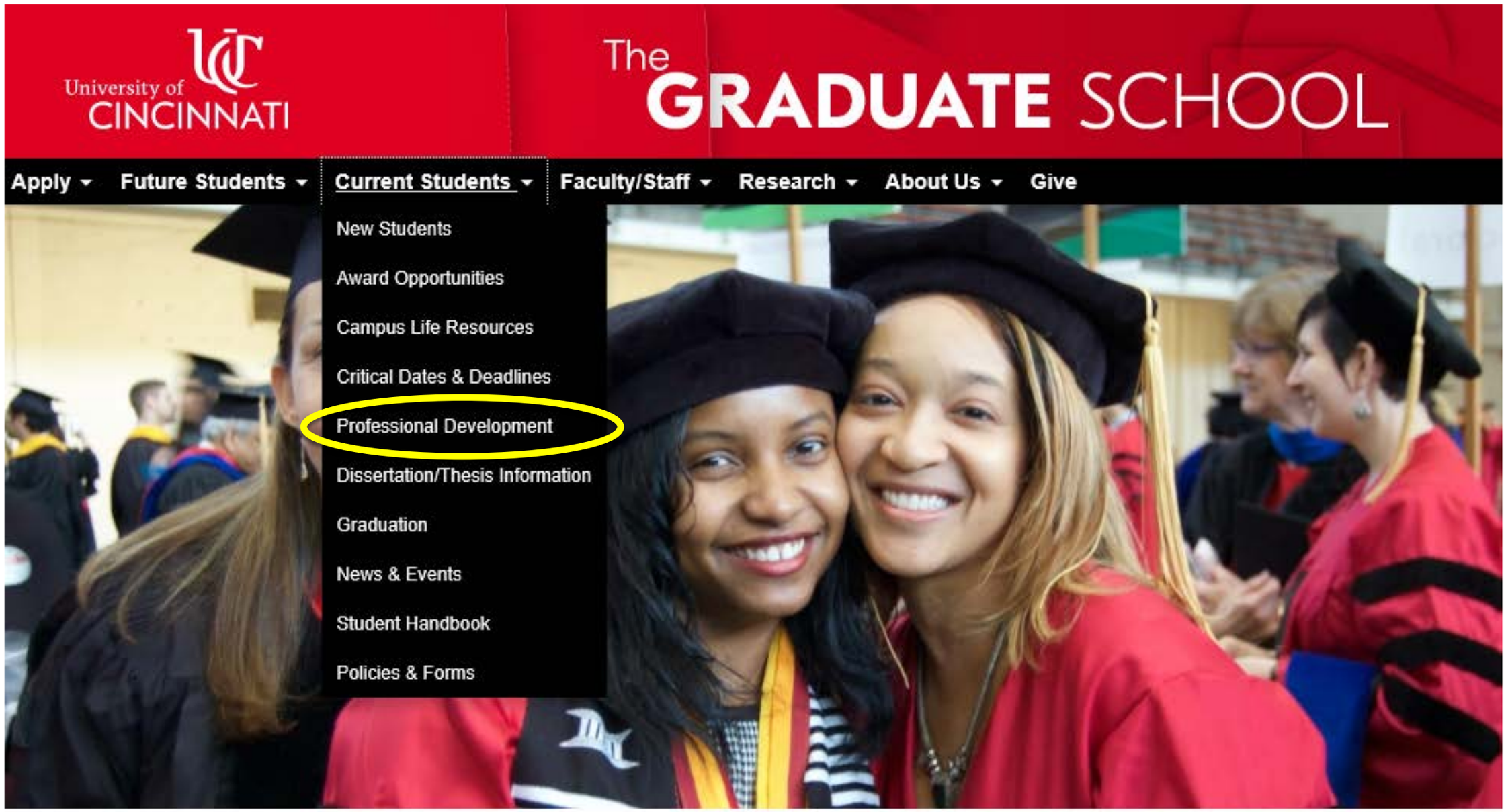
Professional Development for all trainees

http://grad.uc.edu/



The Graduate School

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Professional Development for all trainees

http://grad.uc.edu/student-life/grow.html

Individual Development Plan

A strategic tool to guide students through career and professional development.

Donuts and Development

This yearly event is a one-stop shop to visit various professional development groups, offices and courses across the university.

Campus Resources

Offices across campus provide professional development opportunities for graduate students such as writing assistance, teaching guidance, job search help, and more!

Preparing Future Faculty

A graduate certificate program in modern teaching and learning; offers rich mentoring experiences to strengthen career skills!

Graduate Student Expo

A yearly event that showcases graduate student research, scholarship and creative works.

Workshops

Workshops supplement a students academic training by providing brief, specific skill-building sessions on professional and personal development.

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Support for graduate students

http://www.uc.edu/cetl/gate.html **GATE** = Graduate Association of Teaching Excellence. Student-run group providing teaching advice and workshops.

http://www.uc.edu/aess/lac/writingcenter/grad.html **Graduate Writing Center**. Get help with writing challenges faced by all young professionals.

https://www.uc.edu/gsga.html **GSGA** = Graduate Student Governance Association. Travel awards! Fellowships! Peers!

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Leading original research projects of graduate students

- To lead a dissertation (PhD) or thesis (Masters) project, you need to be a member of the graduate faculty.

- If your Department/Division is home to a graduate program, talk with the graduate program director who runs the program about being nominated to join the graduate faculty.

- Graduate faculty are full-time faculty who have an active research program as part of their position (primarily tenure-track faculty).

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Other options for involvement with graduate students

If your Department/Division is NOT home to a graduate program, investigate the multi-department programs that intersect with your academic interests. They can also nominate you to join the graduate faculty.

You do NOT need to be graduate faculty to

- be a member of a dissertation/thesis committee
- to teach in graduate courses
- to lead a capstone project.

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How do I support a student?

- The Graduate School annually distributes about $40M in tuition scholarships and $20M in stipend to colleges, and colleges decide how to distribute the funds within their graduate programs. GS funds are supplemented by college/dept funds, and grant and contract funds.

- Most PhD students get full tuition scholarships and a stipend, but the stipend amount and duration of support from the graduate program varies widely.

- In general, Masters student support is less lush. Most commonly students get no, or minimal, scholarship. Stipends are unusual for these students, except in departments that lack a doctoral program.

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More money stuff about students

- Grad students are less expensive than postdocs in both salary and fringe benefits.
- Graduate Assistants (Research or Teaching) are eligible for a subsidy of their student health insurance from the Grad School.
- In some disciplines/programs, it is expected that the primary mentor will support their student after a certain point. Make sure you know local expectations.
- Always look for external funding opportunities, and many of you will have included support for trainees in your startup funds request. There are some college specific funds.

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Postdoc Mentoring and Considerations

- UC averages around 150 Postdocs and 50 Visiting Scholars.
- Currently, no formal required programming on West Campus. There is programming on East Campus. There is a proposal from the Research Advisory Board to the VPR to change this.
- NSF requires a mentoring plan for all proposals that fund Postdocs who are not included as Senior Personnel on the grant.
- The NSF mentoring plan must be no more than one page and can include activities such as:
  - Career counseling
  - Training in preparation of grant proposals, publications, and presentations
  - Guidance on ways to improve teaching and mentoring skills
  - Guidance on how to effectively collaborate with researchers from diverse backgrounds and disciplinary areas
  - Training in responsible professional practices

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Remember trainees are more than cogs in the team

The U.S. Council of Graduate Schools studied what employers value in graduate students.

They are:

- Advanced content knowledge
- Ability to analyze and synthesize data or information
- High-level skills to examine & solve complex problems
- Creative intellect to inspire innovation and drive discovery

You have to foster these talents by working closely, and sometimes things don't always go as planned. What to do then?

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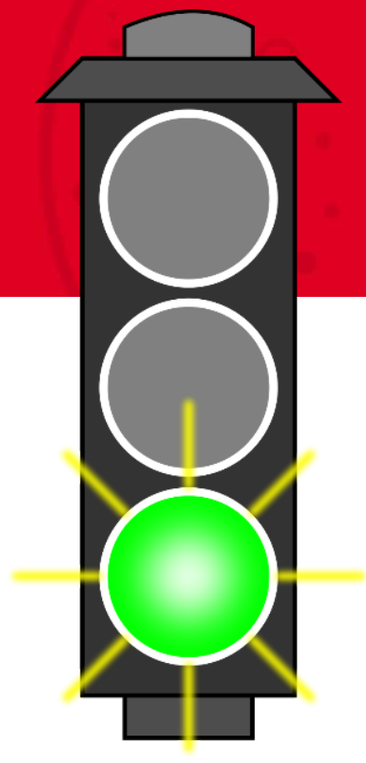
Managing a deficit



No one is perfect

Identifying the deficit EARLY gives everyone time to adjust and compensate while minimal damage has been done and communications lines stay open

- Realign a project to suit everyone better and invest time
- Meet regularly and talk frankly about challenges
- Work hard and smart to restore enthusiasm and optimism
- Share/review things in writing so no one forgets or misunderstands (selective hearing loss)

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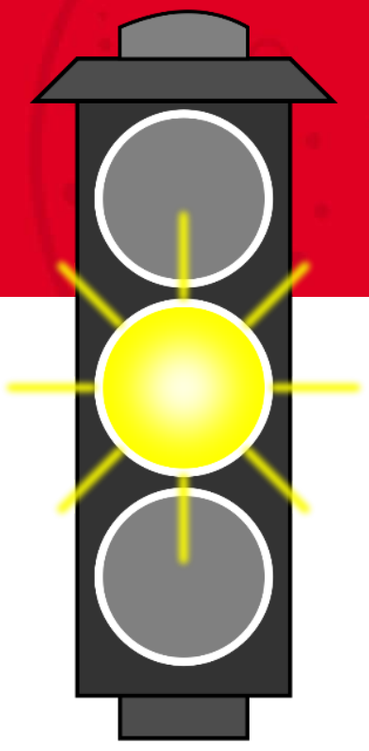
Managing a deficit



Consistent concerns

Identifying the deficit LATE means adding some more ways of compensation to balance deeper concerns and strained communications

- Get help if you need it to bridge the gap (mediators, alternate mentors)
- Salvage what you can from the investment you have made (smaller papers, lowered ambitions)

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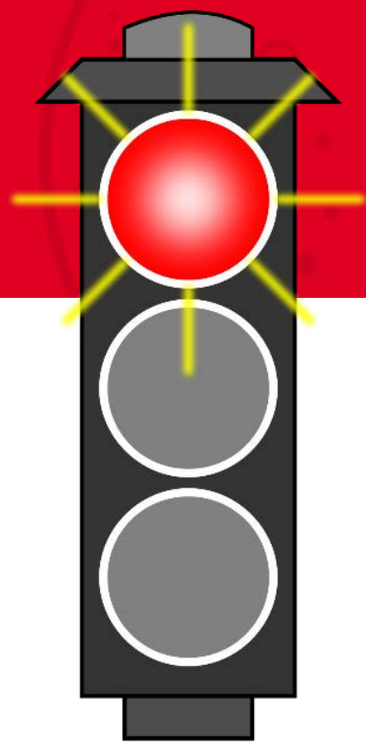
Managing a deficit



It is the centerpiece of the relationship

A deficit is TERMINAL when it degrades performance and every communication is problematic

- Always keep it professional: be fair, calm, and constructive
- Get advice on how to handle situations
- Develop an exit strategy and timeline that meets everyone’s needs

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A roadmap to avoid potholes with any team member

Be aware, open, and talk

- Clarify expectations of how time is invested
- Set up regular meetings and expect robust, challenging discussion
- Come to meetings prepared, with talking points (data/ideas, questions)
- Make it easy to get and give formative feedback
- Share one personal item in each meeting. Help the other person understand you and your goals

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Enough Advice….

The advice I would give to someone is to not take anyone's advice.
Eddie Murphy

Good advice is something a man gives when he is too old to set a bad example.
Francois de La Rochefoucauld

Lets work on situations

Wise men don't need advice. Fools won't take it.
Benjamin Franklin

Remember this, folks - I am a Hillbilly, and I don't always bet the same way I talk. Good advice is one thing, but smart gambling is quite another.
Hunter S. Thompson

I hate to advocate drugs, alcohol, violence, or insanity to anyone, but they've always worked for me.
Hunter S. Thompson

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Enough Advice….

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Thank you!

Questions?

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Resources

Barker, K. 2010. *At the Helm: Leading Your Laboratory*, 2nd Edition. Cold Spring Harbor, New York: Cold Spring Harbor Laboratory Press.

National Postdoctoral Association, http://www.nationalpostdoc.org/ (recommends Individual Development Plan and Research Roadmaps)

Institute of Medicine, National Academy of Sciences, and National Academy of Engineering. 2000. *Enhancing the Postdoctoral Experience for Scientists and Engineers: A Guide for Postdoctoral Scholars, Advisers, Institutions, Funding Organizations, and Disciplinary Societies.*. https://doi.org/10.17226/9831.
(Free to download from NAE site)

Integrating Undergrads onto your Research Team

Megan Lamkin, PhD
Director, Undergraduate Research

…supporting a university-wide **culture of undergraduate research** where students of all disciplines work with faculty to produce new knowledge & innovation.

Group discussion	10
Historical context	5
Resources	5
Questions	5

Reflect 1 minute

I don’t have time for all that hand-holding.

Reflect 1 minute

The benefits are well-worth the investment.

Rate your current sentiment

1 2 3 4 5

Not worth it… …well worth it

Mutually beneficial mentor-mentee relationships occur when…

Context

A brief history of Undergrad Research in the US

Resources

Undergrad Research Web Pages

Coming Soon

Research Mentor Training
Theme-based Research Co-op Programs

Mentoring Undergrads

Mutually beneficial mentor-mentee relationships are possible

Megan Lamkin, PhD
Assistant Professor | Program Director for Undergraduate Research

Summary statement

Each year, hundreds of undergraduate students across the university engage faculty for apprenticeship-style research experiences. Many faculty & other research professionals on campus are reluctant to work with undergrads because they "don't have time for all that hand-holding." This is reasonable sentiment, especially if mentoring an undergrad through a research project is not factored into your workload.

However, it is also true that integrating undergraduate students onto your research team can increase your productivity and enliven your research environment. The key to achieving that end is (1) strategic recruitment; (2) scaffolded integration onto the research team; and (3) regular opportunities for communication & relationship building.

Step 1. Strategic Recruitment

A. Develop description of opportunity using this template)
B. Use campus resources to recruit candidates
    i. You post on Handshake: http://www.uc.edu/campus-life/careereducation/employers/hire-student/post.html

    ii. I share with my networks: Undergraduate Research Society; Grad-Undergrad Research Connections Program; Social Media; McNair, LSAMP, FirstGen, others.

    iii. Meet 3 students & review vision; start building your team

Step 2. Scaffolded Integration onto the Research Team

A. Introduce & welcome into research environment in a way that allows mentee to feel included as a valued member of the research team
    i. Review position description; ensure team-wide respect for culture & rules
    ii. Post-docs & grad students make great mentors; faculty is ultimately responsible, so make sure others well-prepared to take on an undergrad (can send to training via Grad-Undergrad Research Connections Program)
    iii. Orient to infrastructure of research environment (e.g., space, equipment, protocol)
B. Draft goals for semester + options for a second semester if all goes well
    i. First semester focused on development (Lab/team meetings, paper discussions, training, taking on tasks)
        a. Student gains perspective on the big picture goal + rationale for specific projects; methods/codes of conduct; how to gather & process information + practice communicating research purpose, process & outcome

b. 5-10 hours/week (volunteer or credit)

ii. Second semester: undergrad takes lead on a project
   a. Integrated into all aspects of the research process
   b. Presents purpose, process, & outcome @ Undergraduate Scholarly Showcase
   c. 10-20 hours/week (credit or pay)

Step 3. Regular opportunities for communication & relationship building Human connection -> mutual trust -> productivity

A. Receive updates; provide guidance & feedback; modify goals
B. Celebrate achievements