Resources for Mentoring Undergraduate Students

FUTURE invites you to share with us other resources that might be added to this list (send to bettye@toxicology.org).

Implicit Bias Exercise—PBS Learning Media

Unconscious Bias Course--NMRN

1. For Faculty Mentors

Mentoring online guide from NASEM: **The Science of Effective Mentoring in Science, Technology, Engineering, Medicine, and Mathematics (STEMM)**

Faculty Mentors

- Create opportunities to reflect on mentorship, assess mentees' needs, and set expectations in labs and research relationships.
- Participate in mentorship education activities to become more aware of practices, career and psychosocial support functions, and to learn to set reasonable expectations in mentor-mentee relationships.

References

A. *The Science of Effective Mentorship in STEMM* (2019). National Academy of Sciences, Engineering, and Medicine.
Public release recording
The Science of Mentorship Podcast

B. *Entering Mentoring* (2015). Pfund, Branchaw, and Rediske. Purchase paperback.

   Entering Mentoring: A Seminar to Train a New Generation of Scientists PDF (2005). Handelsman, Pfund, Lauffer, Pribbenow

C. CIMER *Entering Mentoring* Curricula and Training Modules, developed in coordination with NMRN

D. *The Mentoring Manual: IBP Guide to Mentoring*, NSF Institute for Broadening Participation. https://www.pathwaystoscience.org/pdf/ManualComplete.pdf
Guide for mentors and for students

E. Mentoring Structures and the Types of Support Provided to Early-Year Undergraduate Researchers. 2020. Deyhan, G.D> and Tillotson, J.W. CBE—Life Sciences Education 19(3)

F. Consider establishing a formal IDP for your mentees: [The Entering Research IDP for undergraduate students:](#) From CIMER. The "Professional Development Plans" activity may be accessed for free once a profile is created.

G. Another useful tool is a mentoring contract. Examples of these include ones from [Oregon State University](#), [Oklahoma State University](#), and [University of Wisconsin Madison](#).

H. Understanding Interventions [Vol. 11, Issue 1: The Use and Impact of NIH-fueled Resources for Mentoring— Reports from the Field, 2020](#)

I. The Art of Scholarly Mentoring: [Inside Higher Education](#). Nobel Laureate Robert Lefkowitz shares 10 golden rules gleaned from a half century of mentoring hundreds of research trainees.

J. [National Mentoring Research Network](#): NIH-funded mentoring resources for mentors and mentees, references, webinars, etc., as well as a mentor/mentee matching system.
    Webinars
        [The Role of Mentoring in Promoting DEI in STEM Education and Research](#)
        [How to Be an Effective Mentor for Underrepresented STEM Trainees](#)

K. [Optimizing the Practice of Mentoring](#): Free self-paced online course through the University of Minnesota (typically 2 hours), to prepare faculty to be effective research mentors. Content is organized into five modules: 1) mentoring models, 2) mentor roles and responsibilities, 3) structured approaches to navigating a mentoring relationship, 4) exploration of mentorship practices, and 5) addressing mentorship challenges.

L. [Resources for Mentors](#). University of Oklahoma

M. Culturally Aware Mentoring
        [A Conversation on Culturally Aware Mentoring](#)
        [Resources and Strategies to Enhance Culturally Aware Mentoring](#)

2. **For Undergraduate Researchers**

A. Introduction to Toxicology Modules
    - National Library of Medicine: [ToxTutor](#)
    - [ToxMDST](#) modules (Pathophysiology, Biochemistry and Molecular Genetics, Principles of Genetic Toxicology, Applied Systems Toxicology, Regulatory Toxicology

B. [National Mentoring Research Network](#) resources for undergraduates, including:

- Launching Research. Part 1: Laboratory Readiness, has been released. This series presents research as an exciting activity and provides tools to tools for use throughout their education and career.

C. Free courses from iBiology

1) Let's Experiment

Guide through the steps of planning a well-designed experiment, so by the end of this course, you will have:

- A detailed plan for your experiment(s) that you can discuss with a mentor.
- A flowchart for how to prioritize experiments.
- Tips and best practices for how to get started with an experiment.
- A lab notebook template that is so impressively organized, it will make your colleagues envious.
- A framework to do rigorous, reproducible research.

Includes 5 comprehensive modules and 1 experimental plan

- Module 1 - AN INTRODUCTION TO EXPERIMENTAL DESIGN: So you have an experiment in mind? This module shows you how to get started.
- Module 2 - KEY ELEMENTS OF EXPERIMENTAL DESIGN: How to think carefully through key features of an experiment, such as variables, controls, sample size, and replication.
- Module 3 - ACCOUNT FOR YOUR OWN BIAS: How to identify your own bias as an experimenter and safeguard your experiment from that bias through rigor and transparency.
- Module 4 - GEAR UP TO DO THE EXPERIMENT: Some tips and best practices on how to familiarize yourself with a protocol, validate key reagents, and keep a good lab notebook.
- Module 5 - GETTING THE EXPERIMENT TO WORK: Some tips and best practices on how to pilot, troubleshoot, and optimize an experiment.
- MY EXPERIMENTAL PLAN: As you work through the course, you will be prompted to apply what you're learning to your own research. Responses to these exercises will be captured in the downloadable document called "My Experimental Plan." It is organized in a way so that relevant sections may be integrated into your lab notebook.

2) Planning Your Scientific Journey

Being successful as a scientist requires more than acquiring knowledge and developing experimental skills. It also requires: (1) asking a good scientific question, (2) establishing a clear plan of action, and (3) seeking advice along the way. These three topics are the focus of this course "Planning Your Scientific Journey," which is aimed primarily at life science graduate and undergraduate

students, but also useful for postdocs, staff scientists, and others who could benefit from learning or reviewing these topics.

By the end of the course, you will have:

1. Criteria to evaluate a research question.
2. A plan for how to approach your scientific question and other research goals.
3. An agenda for a meeting with your mentor to get feedback on your plan.

D. CIMER Training Modules, developed in coordination with NMRN

https://www.cimerprojectportal.org/#/completeCurricula/mentee