Mentorship of undergraduates in research during suspension of in-person instruction

Over 1200 undergraduates are currently completing a senior thesis through 198 and 199 courses. As we move into Spring term there have been questions as to how faculty can continue research projects with students who are unable to work in-person on their projects. Below are a few suggested methods for on-line learning for the beginning of Spring term:

Remote Research and Data Analysis

- Initiate discussions of figure construction and data analysis. If the student's data are not accessible to them remotely, place files into a secure BOX for sharing and discussion.
- Establish collaborations with those able to collect data for students to analyze or rearrange work/team structure to facilitate data collection and sharing with students.
- Now would be a good time to consider adding a computational component to the student's project. These components can include:
    - Bioinformatics - The National Center for Biotechnology Information hosts courses, hackathons, live webinars, and webinar recordings to supplement your biotechnology education.
    - Data Science Work
    - Modeling
    - Robust Statistical Analyses

Expanding Comprehension of Research Project

- A careful reading and understanding of the relevant background literature is fundamental to research. Use ZOOM to initiate an on-line journal club or other research literature discussion with your undergraduates.
    - Set up your computer to access UCLA Library resources (such as databases, electronic journals, and e-books) from off-campus.
    - This resource provides a bank of quick and practical reading strategies that can help you build your own reading strategies toolbox.
- Help your student explore the field. Suggest new areas for the project and readings that would help get them up to speed in those new areas.
    - UCLA Library's research guides can help you find the best databases and search tools for your topic, and help you more quickly find the information you need.
    - The tutorial, 'Finding Scholarly Articles,' will help you successfully navigate search filters, construct effective searches, and download the full texts of your articles!
    - Finding and using review papers can add a great deal to students' understanding of the topic and state of knowledge in a given field.

- Have students survey the current literature related to their project and/or the overall research focus of your group. (WI+RE database and searching help)
  - Show your students how to search experimentally and how to turn research questions into keywords.
  - Challenge yourself and your students to actively seek sources that push outside of your starting perspectives.
  - Teach your student the difference between primary and secondary sources.

Expanding Scientific Writing Skills

- Ask your students to focus on written work for the first two weeks of the quarter. Suggest that your students begin working on drafts of the introduction and/or methods sections, as these can be worked on remotely. The following tutorials can help your students get started:
  - Zotero makes collecting, organizing, and analyzing your research sources easy.
  - This video takes students through the creation of a literature review which can either be included within a larger paper (as the Introduction) or written as a stand-alone manuscript (a Review Paper).
  - Ten Simple Rules for Structuring Papers walks readers through the process of putting together a research manuscript.
  - This tutorial teaches students how to properly integrate citations into their writing.
  - To help break up the writing task into manageable pieces, students can utilize the Research Paper Planner made available with additional links to resources.
    - There is also a version of the paper planner that is customized to submissions for UCLA's Undergraduate Science Journal. Students have 3 tab options (short version, full length research paper version, or full length review paper version). Be sure to encourage your students to submit their work to the USJ so they can add this accomplishment to the CV's. You can still publish the data later in a higher journal.
    - For students in the Humanities and Social Sciences, encourage them to submit their work to *Aleph* at UCLA.
  - UCLA's Writing Center is able to remotely work with students on their writing.
  - UCLA Library is available via chat 24/7 for students and researchers and you can even reach out to subject specialists for help.
- Work with your students to write a review article.
  - In addition to UCLA's Undergraduate Science Journal, which accepts original research and review articles from any STEM field, there are many venues available for undergraduates to publish review articles.
  - Direct students to this collection of resources and tips for creating their literature review along with the above-listed resources.

Expanding Other Research Skills and Professional Development

- Discuss the importance of documentation of research work. Review their lab notebook with them via [ZOOM](#) and discuss ways to improve the table of contents, data analysis, etc.
- Plan for future experiments. Charge students to create protocols for future work, or study methods utilized by other groups.
    - Include discussions on [time management](#) and proper controls.
- Task your student with completing an [Individual Development Plan](#) and then discussing with you their career questions and professional development needs.
    - Make sure they understand they know where they can learn about different careers in their field of interest.
        - Introduce them to relevant professional societies and their career resources.
    - Discuss with students what a faculty position in your area entails and what it means to be tenured.
    - Walk students through the [graduate school application process](#) and what you look for in candidates.
    - Encourage your students to conduct [Informational Interviews](#) with colleagues and professionals in careers of interest to your student.
    - Review your student's [CV or resume](#) and provide feedback for improvement.