Mentoring Plans

Three mentoring plans are provided: A, Mentoring plan for junior faculty by the faculty mentor; B, Mentoring plan for the graduate student by the PI; C, Mentoring plan provided to four undergraduate students by the PI.

A. Mentoring plan for junior faculty by the faculty mentor

Prof. Noble (Associate Professor in the PhD Program in Microbiology) will be responsible for mentoring the PI, Dr. [redacted], who is a junior faculty member [redacted]. Below, Noble has outlined an 8-step program of structured mentoring activities intended to enhance the research experience of the PI. The program is based on the personal experience of Prof. Noble as a mentor to post-doctoral fellows (1, 2).

1. Orientation: Prior to our first meeting, Noble will email the PI a list of expectations, and request that they conduct an **individual development plan** (IDP). Both the expectation list and the IDP will serve as a written communication tool for the first meeting. At the first meeting, the PI and Noble will have an in-depth conversation on mutual expectations in terms of: (i) the amount of independence, (ii) inter- and intra-laboratory interactions, (iii) productivity in terms presentations in conferences, (iv) work habits (e.g., time spent in laboratory doing work versus time spent in office analyzing data and writing papers), (v) the need for detailed documentation of research methodologies so that others can repeat experiments, and (vi) data ownership and the requirement that all data produced in my laboratory shall be made available so that others can validate the research. Noble will also provide a statement on my previous research successes. The intent is to provide the PI with a document (after the meeting) that indicates our mutually agreed upon mentoring activities.

2. Career Guidance: Noble's objective will be directed at providing the PI with the skills, knowledge, and experience needed to advance in their research and career. In addition to the providing guidance, Noble will encourage and facilitate collaborations with researchers. Noble will also provide guidance in choosing and applying for funding proposals, journal publications and local and national presentations.

3. Preparation of Grant Proposals: Noble will add support and guidance in grant proposals to external funding agencies. He will help the PI in identification of key research questions, definition of objectives, description of approach and rationale, and construction of a work plans, timelines, and budgets.

4. Publications and Presentations: Noble will provide guidance in writing publications and making presentations of their research at local and national meetings. In the past, Noble has help other scientists (e.g., Alex Pozhikov) published research articles in high impact scientific journals (e.g., Nucleic Acids Research) and helped others in the process by guiding and training them in the preparation of manuscripts for scientific journals and presentations at conferences.

5. Teaching and Mentoring Skills: Noble will encourage the PI to develop leadership skills in terms of mentoring and training students and postdocs in the laboratory. In

addition, Noble will encourage them to describe his/her work to the members in her research group and others at the university and other research facilities. Noble will assist with solutions to challenging research problems and other my networking skills to assist in finding solutions, which often results in cross-fertilization of ideas.
6. Instruction in Professional Practices: Noble will encourage the PI to affiliate with one or more professional societies. Noble will also inform the PI of necessary university and professional procedures and protocols that will help further the PI on the most effective career path.
7. Technology Transfer activities: The PI will be encouraged to become familiar with the university-technological transfer activities including applicable confidentiality requirements and preparation of invention disclosure applications.
8. Success of the Mentoring Plan: Success in fulfilling the mentoring plan will be assessed by monitoring the progress of the PI through the quantity and quality of grant proposal submission and awards, scientific journal publications and presentations. Noble intends to have annual written reviews of the PI's progress and will encourage the PI to assess my mentorship.

B. Mentoring plan for the graduate student by the PI

One Masters Student (MS) will be funded on this project. Below the PI has outlined an 8-step program of structured mentoring activities intended to enhance the Master's student's experience. The program is based on personal experience as a graduate student, postdoc and mentor (1, 2).

1. Orientation: Prior to our first meeting, the PI will email the MS a list of my expectations, and request that he/she conducts an **individual development plan** (IDP). Both my expectation list and the IDP will serve as a written communication tool for the first meeting. At the first meeting, the MS and I will have an in-depth conversation on mutual expectations in terms of: (i) the amount of independence, (ii) interactions with coworkers (inter- and intra-laboratory), (iii) productivity in terms of peer-reviewed publications and presentations in conferences, (iv) work habits (e.g., time spent in laboratory doing work versus time spent in office analyzing data and writing papers), (v) the need for detailed documentation of research methodologies so that others can repeat experiments, and (vi) data ownership and the requirement that all data produced in my laboratory shall be made available so that others can validate the research. I will also provide a statement on my previous MS successes. My intent is to provide the MS with a document (after the meeting) that indicates our mutually agreed upon understanding of the MS appointment.
2. Career Guidance: My objective will be directed at providing the MS with the skills, knowledge, and experience needed to advance in his/her chosen career path. In addition to the guidance provided by me, the MS will be encouraged to discuss career options with researchers at ASU and with former students and colleagues of mine (e.g., Dr. Stephen Boudreau, Montgomery Medical Laboratory).
3. Experience with Preparation of Grant Proposals: I will guide the MS in how to write grant proposals to NSF and NIH. The MS will learn best practices in proposal

preparation including identification of key research questions, definition of objectives, description of approach and rationale, and construction of a work plan, timeline, and budget.

4. Publications and Presentations: The MS is expected to play a major role in writing publications and presentations and will receive appropriate recognition (i.e., first author). In the past, I have spent most of my interactions with other master's students guiding and training them in the preparation of manuscripts for scientific journals and presentations at conferences.

5. Teaching and Mentoring Skills: I will encourage the MS to develop his/her teaching abilities by having him/her periodically teach graduate courses. I will also encourage the MS to develop leadership skills in terms of mentoring and training graduate students and undergrads in the laboratory. In addition, I will encourage the MS to describe his/her work to others within the group and assist each other with solutions to challenging research problems, which often results in cross fertilization of ideas.

6. Instruction in Professional Practices: The MS will be required to complete laboratory safety courses and Collaborative Institutional Training Initiative (CITI) modules and will be encouraged to affiliate with one or more professional societies. He/she will become proficient in blasting the 454 sequences on the NCBI web site, and interpreting the sequence annotations, and summarizing the results.

7. Technology Transfer activities: The MS will be given an opportunity to become familiar with the university-technological transfer activities including applicable confidentiality requirements and preparation of invention disclosure applications.

8. Success of the Mentoring Plan: Success in fulfilling the mentoring plan will be assessed by monitoring the progress of the MS through the quantity and quality of publications, presentations, and the landing of permanent employment after finishing the Master's program. I intend to have annual written reviews of the MS's progress. I will encourage the MS to assess my mentorship.

C. Mentoring plan to four undergraduate students by the PI

Four undergraduate students will be funded on this project. Below, I have outlined an 8-step program of structured mentoring activities intended to enhance the undergraduate students' experience. The program is based on personal experience as a graduate student, postdoc and mentor (1, 2).

1. Orientation: Prior to our first meeting, I will email the undergraduate students a list of my expectations, and request that they conduct an **individual development plan** (IDP). Both my expectation list and the IDP will serve as a written communication tool for the first meeting. At the first meeting, the students and I will have an in-depth conversation on mutual expectations in terms of: (i) the amount of independence, (ii) interactions with group members (inter- and intra-laboratory), (iii) productivity in terms presentations in conferences, (iv) work habits (e.g., time spent in laboratory doing work versus time spent in office analyzing data and writing papers), (v) the need for detailed documentation of research methodologies so that others can repeat experiments, and (vi) data ownership and the requirement that all data produced in my laboratory shall be made available so

that others can validate the research. I will also provide a statement on my previous undergraduate students' successes. My intent is to provide each student with a document (after the meeting) that indicates our mutually agreed upon understanding of the undergraduate student appointment.

2. Career Guidance: My objective will be directed at providing the students with the skills, knowledge, and experience needed to advance in their chosen career paths. In addition to the guidance provided by me, students will be encouraged to discuss graduate school and career options with researchers and graduate students at ASU and with former students and colleagues of [redacted] In the past, I have spent most of my interactions with other undergraduate students guiding and training them in the preparation for graduate school. Therefore, I will also provide guidance in choosing and applying for graduate school. The students will be exposed to and acquire experience in theoretical and practical methods in molecular biology and genetics (i.e., extracting and sequencing DNA). These experiences will give them an edge in applying to a graduate program.

3. Introduction to Preparation of Grant Proposals: I will introduce the students to how to write grant proposals to NSF and NIH. The students will gain exposure to the best practices in proposal preparation including identification of key research questions, definition of objectives, description of approach and rationale, and construction of a work plan, timeline, and budget.

4. Publications and Presentations: The students are expected to play a role in writing publications and will receive appropriate recognition (i.e., second author), and making presentations of their research at local and national meetings. In the past I have had key interactions with other undergraduate students guiding and training them in the preparation of manuscripts for scientific journals and presentations at conferences.

5. Teaching and Mentoring Skills: I will encourage the undergraduate students to develop leadership skills in terms of mentoring and training other undergrads in the laboratory. In addition, I will encourage them to describe his/her work to others within the group and assist each other with solutions to challenging research problems, which often results in cross fertilization of ideas.

6. Instruction in Professional Practices: The undergraduates will be required to complete laboratory safety courses and Collaborative Institutional Training Initiative (CITI) courses and will be encouraged to affiliate with one or more professional societies. They will become proficient in blasting the 454 sequences on the NCBI web site, interpreting the sequence annotations, and summarizing the results

7. Technology Transfer activities: The students will be given an opportunity to become familiar with the university-technological transfer activities including applicable confidentiality requirements and preparation of invention disclosure applications.

8. Success of the Mentoring Plan: Success in fulfilling the mentoring plan will be assessed by monitoring the progress of the students through the quantity and quality of presentations and the acceptance into a graduate school after earning their degrees. I intend to have annual written reviews of the students' progress. I will encourage the students to assess my mentorship.

Literature Cited

1. National Academy of Sciences Report, 2000. Enhancing the Postdoctoral Experience for Scientists and Engineers: A Guide for Postdoctoral Scholars, Advisers, Institutions, Funding Organizations, and Disciplinary Societies.
2. The Federation of American Societies for Experimental Biology (FASEB) Individual Development Plan for Postdoctoral Fellows and Policy Statement. http://www.faseb.org/portals/0/pdfs/opa/idp.pdf