OFFICE OF RESEARCH AND GRADUATE EDUCATION
ROBERT C. BYRD HEALTH SCIENCES CENTER

DISSERTATION COMMITTEE EVALUATION - BIOMEDICAL SCIENCES DOCTORAL PROGRAMS

This two-part evaluation is to be completed by the student's committee chair following each Dissertation Committee Meeting. One meeting per year is mandatory. This form is to be signed by the Committee, the Dissertation Mentor (if not the committee chair), the Program Director, and the Student. The completed and signed form should be given to the Office of Research and Graduate Education (ground floor Erma Byrd) for placement in the student's file on SOLE.

Student's Name:	**Date of meeting:**
Graduate Program:	**Year in Program:**

Part I: Summary & Future Work

1. Summary of student's history to date:				
Course Work:	☐ Satisfactory Progress	☐ Unsatisfactory Progress		☐ Completed
Qualifying Exam:	☐ Scheduled	☐ Completed	Date:	
Proposal Defense:	☐ Submitted	☐ Completed	Date:	
Pre-doctoral Fellowship application:		☐ Submitted	Date:	
Student has completed experimental work and is ready to write and defend dissertation		☐ Yes		

2. Recommendations for future work:

3. Date for next committee meeting (month/year):

4. Progress on student's plans after graduation: (to be completed beginning in the 4th year)

ERMA BYRD BIOMEDICAL RESEARCH CENTER, GROUND FLOOR
PO BOX 9104
MORGANTOWN, WV 26506-9024

Part II: Assessment of Core Competencies for Development

Select the committee's consensus evaluation of the student's development of each core competency. If competencies are noted to be deficient relative to the student's expected progression, provide suggestions for improvement.
Please note:

- Each core competency may not be relevant to every student. The committee should discuss this and note 'N/A' on the form, if appropriate.
- The goal is for students to reach proficiency in relevant core competencies. Advanced proficiency is not required, but should be acknowledged to recognize exceptional performance.

I.	**Broad Conceptual Knowledge of a Scientific Discipline**	☐ Beginning PhD Student	☐ On the Way to Proficiency	☐ Proficient	☐ Advanced Proficiency
Comments:					

II.	**Deep Knowledge of a Specific Field/Scientific Knowledge Competency**	☐ Beginning PhD Student	☐ On the Way to Proficiency	☐ Proficient	☐ Advanced Proficiency
Comments:					

III.	**Critical Thinking, Experimental Design, & the Scientific Method**	☐ Beginning PhD Student	☐ On the Way to Proficiency	☐ Proficient	☐ Advanced Proficiency
Comments:					

IV.	**Communication Skills**	☐ Beginning PhD Student	☐ On the Way to Proficiency	☐ Proficient	☐ Advanced Proficiency
Comments:					

V.	**Responsible Conduct of Research and Research Ethics**	☐ Beginning PhD Student	☐ On the Way to Proficiency	☐ Proficient	☐ Advanced Proficiency
Comments:					

VI.	**Collaboration and Team Skills**	☐ Beginning PhD Student	☐ On the Way to Proficiency	☐ Proficient	☐ Advanced Proficiency
Comments:					

VII.	**Experimental Skills for Conducting Research**	**Beginning PhD Student** ☐	**On the Way to Proficiency** ☐	**Proficient** ☐	**Advanced Proficiency** ☐
Comments:					

VIII.	**Computational Skills**	***A. Quantitative Analysis***	**Beginning PhD Student** ☐	**On the Way to Proficiency** ☐	**Proficient** ☐	**Advanced Proficiency** ☐
		B. Bioinformatics Skills	**Beginning PhD Student** ☐	**On the Way to Proficiency** ☐	**Proficient** ☐	**Advanced Proficiency** ☐
Comments:						

We, the undersigned, have received and read this memorandum of this Dissertation Committee Meeting, had all pertinent questions to this memorandum satisfactorily answered, and agree to the course of action as described above.

Signatures of Graduate Student Advisory Committee: **Names of Committee Members (typed)**

_____ **(Chair)** _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____ _____

Signature of Student **Printed/typed Name** **Date**

_____ _____ _____

Signature of Dissertation Mentor ***(if not Committee Chair)*** **Printed/typed Name** **Date**

_____ _____ _____

Signature of Graduate Program Director **Printed/typed Name** **Date**

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Assessment of Core Competencies: Supplemental Guide

I. Broad Conceptual Knowledge of a Scientific Discipline

Beginning PhD student	On the way to proficiency	Proficient	Advanced proficiency
Basic knowledge of physics, chemistry, mathematics, and advanced college level knowledge of biology.	Reads research and review articles on broad set of topics including but not limited to biochemistry, genetics, pharmacology, [physiology], neuroscience and molecular biology. When reading an article, can identify research questions, describe experimental approaches, outline major findings and identify future lines of research.	Familiar with the most significant achievements of current biomedical research, and the principles and capabilities of the major experimental approaches. Identifies the directions in which biomedical research is moving, and the challenges it faces.	Identifies knowledge gaps, proposes hypothesis and formulates general research strategies on significant topics in biomedical research that are not part of the specific field of research he/she is currently working in.

II. Deep Knowledge of a Specific Field/Scientific Knowledge Competency

- Working knowledge in basic biological/physiological systems and pharmacology
- Familiarity with common technical approaches
- Historical knowledge for area of particular research focus
- Working knowledge of current literature and expertise of current content within research focus
- Intimate familiarity with theory/strengths/weaknesses of techniques within specific area of research focus

Beginning PhD student	On the way to proficiency	Proficient	Advanced proficiency
With guidance, the student grasps the concepts, hypothesis and approaches immediately related to the experiments he/she is performing. The student is in the process of building the knowledge required for formulating the proposal for the doctoral research.	The student understands the historical context (concepts, experimental approaches, findings) that has lead to the current state of his research field. Has a good grasp of the concepts and experimental approaches immediately related to his/her own research.	The student has deep understanding of the broad field of which his/her research is part of and requires little guidance from the mentor in critically evaluating new research. This understanding includes the broad historical context, current concepts, experimental approaches, and research challenges, regardless if these topics are part of his/her own research.	The student can identify without guidance significant questions and knowledge gaps in the broad field of research not limited to their immediate projects, formulate detailed hypothesis and plan experimental approaches to test them.

III. Critical Thinking, Experimental Design, & the Scientific Method

- Identifying important questions and gaps in knowledge within area of focus
- Formation of testable hypotheses and objectives
- Application of appropriate experimental designs to test hypotheses
- Appropriate statistical approaches
- Interpretation of results
- Basic understanding of bioinformatics

Beginning PhD student	On the way to proficiency	Proficient	Advanced proficiency
With guidance can describe simple experiments: state the premise, describe the capabilities of the approach, outline the expected outcomes and interpret the results taking into account the controls and potential alternative explanations.	Independently evaluates published experiments: identifies capabilities of the approach, outlines the use of controls, describes how the data was interpreted, identifies potential weaknesses and alternative explanations.	Independently designs experiments with well-argued choice of approach and analytical methods, proper use of controls, and rigorous interpretation of the results. Demonstrates understanding of experimental methods, and allows for troubleshooting when positive controls do not work.	Independently designs research strategies that use orthogonal approaches and combine data obtained at multiple levels (molecules, cells, organisms) in order to mitigate the limitations of the individual approaches and convincingly demonstrate the significance of the phenomena being investigated. When evaluating the results, can identify predictions that apply to a context different from the one in which the results are obtained.

IV. Communication Skills

- Technical writing/written communication skills (abstracts, manuscripts, grants, posters)
- Oral Communication both formal and informal (journal clubs, seminars, scientific meetings, elevator pitch)
- Ability to develop and deliver lectures

Beginning PhD student	On the way to proficiency	Proficient	Advanced proficiency
Creates and presents talks at lab and departmental meetings with support from the mentor. Communicates with colleagues to gain knowledge. Timely conveys information required for the smooth operation of research at the levels of the laboratory, department and school. Writing is concise and to the point.	Strives to take a leading role with support from the mentor in presenting their own research and writing funding applications. Argues points and answers questions based on facts and logic. When presenting clearly separates facts from hypothesis and beliefs. Uses appropriate terms. Statements are unambiguous.	Leads the creation of communications that include but are not limited to presentations, papers, and funding applications. Communications are designed to match the level of expertise of the audience by providing adequate background and tailoring the technical level of the language.	Effective communicator that engages audiences ranging from lay persons to leading experts in the field.

V. Collaboration and Team Skills

- Capable of personal interaction
- Professional conduct
- Professional responsibilities (personnel management, budget management)

Beginning PhD student	On the way to proficiency	Proficient	Advanced proficiency
Follows instructions as agreed by the team under supervision by the mentor.	Identifies the expertise of the team members and places his/her contribution within the context of the team.	Sets up realistic expectations and delivers on them. Communicates timely and concisely.	Leads efforts involving multiple team members. Identifies expertise gaps and recruits team members to fill them.

VI. Experimental Skills for Conducting Research

- Identify, design and execute experimental protocols
- Identify and troubleshoot technical issues
- Lab safety & regulatory issues
- Documenting and maintaining research records

Beginning PhD student	On the way to proficiency	Proficient	Advanced proficiency
Familiar with lab safety procedures and regulatory requirements. Executes simple experiments under close supervision	Demonstrates good bench/analytical skills and good consistency. Maintains research records. Troubleshoots technical issues with guidance from the mentor. Requires little supervision when conducting experiments	Results from experiments consistently meet the expected technical range. Independently selects, executes and troubleshoots experimental protocols. Research records are detailed enough to allow independent reproduction of the experiments with no additional input	Independently develops novel approaches and tools. Effectively transfers skills to trainees

VII. Computational Skills

A. Quantitative analysis

Beginning PhD student	On the way to proficiency	Proficient	Advanced proficiency
Follows instructions to carry basic quantitative analysis (estimate averages, error, etc.)	Identifies the appropriate analysis procedures. Explains the results of analysis	Independently incorporates data collection, analysis and visualization procedures as part of experimental design	Carries out analysis and visualization procedures in a programmable environment (Matlab, R, Python, etc)

B. Bioinformatics skills

Beginning PhD student	On the way to proficiency	Proficient	Advanced proficiency
Familiar with nucleic acid and protein sequence nomenclature. Familiar with nucleic acid and protein structure (primary, secondary, tertiary)	Familiar with types of data stored in online databases. Carries out similarity and keyword searches to retrieve sequence, structure and annotation data. Familiar with genome organization and gene structure principles across the major clades	Interprets independently the results of sequence and structure analysis (alignments, location of key residues and structural domains). As part of the interpretation of sequence and structure results provides context related to biological function, activity, phenotypes and disease	Can execute genomics, structure and sequence analysis in a programmable environment

VIII. Responsible Conduct of Research & Research Ethics

- Knowledge of expectations (WVU, granting agencies)
- Exposure through formalized seminars/courses
- Ability to make reasoned decisions
- Knowledge of unethical practices (i.e. plagiarism etc.)
- Knowledge about RCR and how it relates to ethical decision making
- Moral courage and integrity

Beginning PhD student	On the way to proficiency	Proficient	Advanced proficiency

Graduate students in the Biomedical Sciences programs adhere to the highest ethical and integrity standards. Students will strive to the best to their abilities, in accordance with their training and following the established rules, regulations and policies to:

(ii) Protect Human Subject data.
(iii) Care for and protect the health, safety and welfare of research subjects, patients, colleagues, students and visitors.
(iv) Record and report experiments completely, accurately and objectively.
(v) Care for the well fare of the laboratory animals.
(vi) Recognize and acknowledge in full the contributions of others.
(vii) Object to and report unethical behavior and scientific misconduct.
(viii) Protect any information given to them in confidence as long as it does not mask unethical behavior and misconduct.