

September 2007

The thesis guidelines: Procedures for completion and presentation [2007]

Jefferson College of Graduate Studies

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Jefferson College of Graduate Studies, "The thesis guidelines: Procedures for completion and presentation [2007]" (2007). *JCGS Administrative Documents & Policies*. Paper 3.
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MASTER OF SCIENCE PROGRAMS IN

BIOMEDICAL SCIENCES
CELL & DEVELOPMENTAL BIOLOGY
MICROBIOLOGY
PHARMACOLOGY

THE THESIS GUIDELINES

**PROCEDURES FOR COMPLETION
AND PRESENTATION**

RELEASE 2.1

EFFECTIVE 1 SEPTEMBER 2007

THOMAS JEFFERSON UNIVERSITY

JEFFERSON COLLEGE OF GRADUATE STUDIES

PHILADELPHIA, PA 19107

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THOMAS JEFFERSON UNIVERSITY
COLLEGE OF GRADUATE STUDIES
THESIS GUIDELINES

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Guidelines for Master of Science Research Thesis

The purpose of this Thesis Manual is to provide academic procedural guidelines for Master of Science students at Thomas Jefferson University College of Graduate Studies. Procedures for preparation and approval of the research proposal, committee meetings, writing of the thesis and the oral presentation of the Master's thesis are described. All necessary forms and a milestone stage contract and checklist are provided with this manual.

DESCRIPTION

The thesis is guided study and research in the basic sciences under Graduate Faculty supervision. Written and oral presentation of thesis research is required.

PHILOSOPHY

Students should have the knowledge and skills to contribute to the scientific validation of their practice. This requires a thorough understanding of the research process including: review of the literature; formulation of the objectives and specific aims of the research; proposal preparation; development and execution of a research plan; data interpretation; and presentation and dissemination of results in a journal quality paper.

OBJECTIVES

The student will:

- Identify a thesis advisor and, in collaboration with the advisor, identify an appropriate topic. This process should be initiated at least 1 year prior to the expected date of program completion;
- Submit a signed Milestone Stage Contract and Checklist to the MS Program Office JAH M-46. Keep a copy for your records as a checklist of your progress and upcoming commitments (See **Page #17**). This form should be updated and resubmitted at various milestones during your program as a checklist of your progress;
- Review the literature of the proposed topic of research;
- Identify members of the Thesis Committee;
- Develop a hypothesis and a research plan to test the hypothesis;
- Submit a written proposal to the Thesis Committee explaining the question to be answered, the research plan, how the data will be analyzed, and listing the members of the Thesis Committee (See **Pages #5-6**);

- Ascertain, in conjunction with the advisor and Thesis Committee, whether there are:
 - Any intellectual property, *i.e.*, patent issues that might arise from the thesis research.
TJU policy can be found at:
<http://pulse.jefferson.edu/webapps/portal/frameset.jsp>
 - Laboratory animals or animal tissues used in the thesis research.
If any portion of the studies will be carried out utilizing laboratory animals *in vivo* or with materials that are derived from animals at TJU, the studies and the protocols must be approved by the TJU Institutional Animal Care and Use Committee (IACUC).
 - Human subjects or samples are involved.
If the topic of the research and hence the thesis involves human subjects, analysis of materials originating from human subjects, or data obtained from studies in humans (whether the work is carried-out at TJU or not) the TJU Division of Human Subject Protection must be contacted. This contact will help ascertain whether the TJU Institutional Review Board must be consulted.
Pertinent materials can be found at: <http://www.jefferson.edu/osa/irb/index.cfm>
- Prepare and present an oral presentation of the thesis proposal to the Thesis Committee (This is Meeting #1: See below).
- Execute the research plan
- Meet with the thesis advisor and full Thesis Committee as described below. These meetings should be documented on the Record of Thesis Committee Meeting form (See **Page #8**) and noted on the Milestone Stage Contract and Checklist form (See **Page #17**):
 - Meeting #1: Proposal presentation to Thesis Committee
 - Meeting #2: Interim progress report
 - Meeting #3: Oral presentation to the Thesis Committee of the final results for approval (**NOTE: This is not the formal public thesis presentation.**)
- Submit a rough draft of the research thesis to Thesis Committee for review and approval. Revisions suggested by the committee are to be made.
- Upon approval by the Thesis Committee, schedule a formal public JCGS Thesis presentation. Two such opportunities are available during the year in April and November (**NOTE: This is different from Meeting #3**). Check the JCGS web page for the exact dates: <http://www.jefferson.edu/jcgs>
- Submit a final **bound** copy of the thesis with the signature page, signed by the Thesis Committee, to the Office of Graduate Studies, JAH M-46. This should be done on the day of the formal thesis presentation (See **Page #15**).
- Forms for use during the research and thesis process are included in this document and can be copied or printed for use.

THE THESIS COMMITTEE

MEMBERSHIP OF THE THESIS COMMITTEE

There are to be a **minimum of three persons on the Thesis Committee**. **One of the members must be a member of the Graduate Faculty** of Thomas Jefferson University knowledgeable in the area of the thesis. The primary advisor may be a researcher at Thomas Jefferson University, a clinician with strong research interests, or a qualified scientist outside of the institution who has been approved by the Director of the MS Programs. Thesis Committee members who are not on the Jefferson faculty must work in close communication with the Graduate Faculty member of the Committee. In most cases, the primary advisor is the investigator directing the activities in the laboratory or department in which the student will be working on the thesis.

PURPOSE OF THE THESIS COMMITTEE

The purpose of the Thesis Committee is to guide and advise the student in research. The primary advisor must be aware of the specific expertise that the proposed Thesis Committee members will contribute toward the student's scientific growth and development as well as the student's projected research activity. The primary advisor shall act as Chair of the committee. The proposed committee composition must have the necessary expertise in the area of the thesis.

THESIS PROPOSAL

The purpose of the proposal is to clearly and concisely answer the questions **WHAT**, **WHY**, and **HOW**. The proposal, by itself, should explain the purpose of the research and how the objectives will be accomplished. The proposal need not be more than seven to eight double-spaced typed pages in length. Format for the proposal is detailed on the following page (See **Page #5**).

Proposal Format

Proposed Thesis Title

This may be a provisional title, but it should be sufficient to orient the advisor and Thesis Committee to the student's proposed research.

Introduction or Definition of the Problem

This section should answer the **WHAT** and **WHY**. It should describe the specific objectives of the research. It should establish the necessity of the research by summarizing the previous studies that have been done on the subject, the available information, and any deficiencies in this information. It should also relate the significance of the proposed research to the existing knowledge in the field.

Experimental Design and Scope

This section should describe **HOW** the problem will be addressed. An individual reading the proposal should be able to determine whether the protocol design will adequately accomplish the project objective. The members of the thesis committee should be able to determine from this section whether the project is feasible with respect to time, resources, and expertise. The specific steps do not need to be described, but the type of procedure, materials, instruments, and method of evaluation should be clearly stated.

Bibliography

A bibliography based on the current literature should be included. Pertinent journal articles and reference texts should be cited using the format of a major scientific journal. A minimum of 10 references should be included.

Students are encouraged to set-up a bibliography database at this point. Reference database programs, *e.g.*, RefWorks. Training courses in its use are available through Scott Memorial Library (Jeffline) or online.

RESEARCH PROPOSAL APPROVAL FORM

The attached Master's thesis proposal has been submitted by

(Type or print your name in the space above)

(Student Signature)

(Date)

a student in the Master of Science Program in

(Type or print the name of your program in the space above)

The following persons have agreed to serve as members of the Thesis Committee and have found that the student has sufficient knowledge in the field to proceed with the proposed study toward the completion of the Master's research thesis requirement.

SIGNATURES OF THESIS COMMITTEE MEMBERS

(Type or print name here)

(Signature)

(Date)

(Type or print name here)

(Signature)

(Date)

(Type or print name here)

(Signature)

(Date)

(Type or print name here)

(Signature)

(Date)

RESPONSIBILITIES OF THE THESIS ADVISOR

- To assist in the development of the proposal for approval by the committee.
- To ascertain adequacy of the literature search.
- To ascertain whether intellectual property, IACUC and IRB issues need to be resolved and authorizations obtained prior to proceeding with the project design.
 - The student should participate in the preparation of the necessary forms as part of the learning experience, but the advisor may need to be the official contact for University purposes.
- To assist the student in project design including necessary revisions.
- To instruct, demonstrate, or make available to the student technologies, equipment, instrumentation, samples for testing, or laboratory space as needed for the completion of the project.
- To guide the student in data interpretation.
- To guide the student in the preparation of illustrations, graphics presentations, *etc.*
 - Training courses are available through Scott Memorial Library in PowerPoint and Photoshop.
- While it is ultimately the responsibility of the student to be motivated and reach closure on their research and writing of the thesis, it is expected that the Thesis Advisor will exercise the supervision necessary for the student to complete the project on schedule. This should also include making sure that all relevant forms are signed on-time and that the Milestone Stage Contract and Checklist stays current; this includes both the student's copy and the one in the student's files in JAH M-46.
- To collaborate with members of the Thesis Committee in the final evaluation of the project.

The Thesis Advisor is responsible for overseeing that an appropriate level of scholarship is exhibited by the thesis. The thesis must demonstrate a high degree of professional and scientific competence. The candidate's Thesis Committee can provide the student with the guidance and instruction necessary to achieve this competence. **The Thesis Committee should meet regularly**, at least twice per year, to evaluate progress during the student's period of research activity. While three meetings are suggested, more may be necessary. Records of these meeting must be submitted to the Director's office in the College of Graduate Studies (JAH M-46).

RECORD OF THESIS COMMITTEE MEETING

Student _____ Program _____

To the student:

- Complete the information requested below on a separate sheet of paper and attach it to this form. Type or computer-generate your report.
- Have the designated individuals sign in the appropriate places on this form and have your thesis advisor initial the attached sheet as well.
- Return this form, with the initialed attachment, to the College of Graduate Studies office, M-46 Jefferson Alumni Hall.

MEETINGS OF THE THESIS COMMITTEE

Full Thesis Committee meetings are to be held, at a minimum, twice annually. Following each meeting, present a one-page overview of your thesis progress to date and recommendations by your Thesis Committee members as to the future direction your research should take. Below, sign your name and have your thesis advisor and each member of your committee sign his or her name.

Date of Committee Meeting _____
(Date)

(Student Signature)

(Thesis Advisor's Signature)

SIGNATURES OF THESIS COMMITTEE MEMBERS

(Thesis Committee Member)

(Thesis Committee Member)

(Thesis Committee Member)

RESEARCH THESIS FORMAT

The final version of the thesis should incorporate all necessary changes and corrections stipulated by the Thesis Committee. **One bound copy** of the thesis containing original photographs and illustrations should be submitted to the College of Graduate Studies Office, M-46 Jefferson Alumni Hall, on the day of the thesis presentation. A copy bound or unbound of the final thesis should be given to each of the Thesis Committee members. All copy including footnotes, legends, figures, tables and the bibliography should be typed double-spaced on one side of 8.5" by 11" bond paper. Margins should be at least 1" on all sides. Any standard type face or font is allowed as long as it is extremely legible and consistent throughout the document. Suggested type fonts and pitches are: Times 12; Tahoma 10; Arial 10; and Verdana 10.

The general format is as follows:

TITLE PAGE

Include title, student's name, date, program and institutional affiliation, the Thesis Advisor's name and a listing of all Thesis Committee members.

DEDICATION

Optional

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

ACKNOWLEDGEMENTS

This page expresses appreciation for all those who assisted the student and mentions any permission obtained to quote copyrighted material and any special funding

ABSTRACT

The abstract should briefly describe: 1) the focus of research; 2) experimental design and methods of data collection; 3) summary of findings and; 4) conclusions. The abstract should be limited to approximately 150 words and is different from the abstract submitted for the oral thesis presentation.

INTRODUCTION

States the objectives and aim of the research and relates the project work to an existing body of knowledge on the subject. (Review of literature, statement of the problem)

MATERIALS AND METHODS (EXPERIMENTAL DESIGN)

This section is an expansion of the same section in the proposal. After reading this section a scientist should be able to replicate your work. Previously published procedures should be referenced in the bibliography.

RESULTS

Present the collected data and its analysis.

DISCUSSION

Include data interpretation and conclusions drawn from your findings. The discussion should accurately reflect the project findings such as unexpected results, *etc.* and relate these findings to existing knowledge on the topic. Any difficulties encountered in the research or recommendations for further study should also be included.

BIBLIOGRAPHY OR LIST OF REFERENCES

Every reference cited in the text must appear in the bibliography. Pertinent journal articles and reference texts should be cited using the format of a major scientific journal. If the thesis is planned to be submitted for publication in a journal, the format required by that journal should be adhered to. This information (Information for Authors) is published annually by each journal and will also be available at the journal's web site.

RESEARCH THESIS EVALUATION

The final research thesis will be evaluated by the Thesis Committee (see **The Thesis Committee** section – See **Page #4.**) Evaluation will be based on:

- Appropriateness of the research;
- Adequacy of the literature search;
- Organization and execution of the research plan;
- Research scope and level of difficulty;
- Validity of conclusions;
- Quality and thoroughness of the written thesis;
- Adherence to deadlines.

SUBMISSION OF WRITTEN THESIS AND ORAL PRESENTATION

A public research seminar is scheduled for the presentation of the thesis by the candidate. This presentation is required for graduation. The candidate must demonstrate competence in his/her specific area of research. The thesis research is presented to the audience in an oral presentation with accompanying graphics. The candidate must display the ability to answer questions pertaining to the study for those in attendance.

Presentations are scheduled twice each year: April and November. Students who present in April and have completed all other requirements for graduation will be eligible to graduate in June of the same year. Students who present in November, for whom this is the last requirement to complete their program, will be invited to attend the graduation ceremony in June of the following year. If needed, these students may request a letter from the Registrar indicating the completion of all program requirements for the Master of Science degree in November.

- It is recommended that the student present a neatly typed "draft" copy of the thesis to the members of their Thesis Committee at least a week prior to the final committee meeting. Photographs, graphs, illustrations, and tables need not be the originals for this final draft copy of the thesis but it must have sufficient content to allow the committee to determine if the student will be able to complete all the requirements prior to submission of an abstract for presentation.
- Students need to incorporate suggestions from the Thesis Committee into their written thesis for the final version. Students may have to present more than one draft of the thesis to their committee.
- Only those students who have completed their thesis research and have had their rough draft of the thesis approved by their committee may apply to make the oral presentation. This will be evidenced by submission of the signed Milestone contract for this event (**Page # 17**)
- The final Thesis Committee meeting should occur **prior** to submitting the abstract for the final oral presentation.
- Approximately 1 month prior to the scheduled thesis presentation the student must submit an abstract of his/her study. The abstract is to be submitted online using the following instructions. The abstract must be provided to the JCGS office prior to the presentation.

GUIDELINES FOR PREPARING A THESIS PRESENTATION ABSTRACT

By convention, scientific abstracts have a precise format. This makes it easier for the reader to quickly and efficiently grasp the complex scientific content of these short summaries. In preparing the abstract, single-space all items. Use the Tahoma 11-point font which is the font style used for this document. Do not indent or otherwise format any part of the abstract. Please be aware that the abstract will be published on the Thomas Jefferson University College of Graduate Studies' web page for a period of **2-3 weeks** prior to your formal oral presentation of your thesis. According to the Jefferson Office of Technology Transfer, publication of your abstract on the TJU web page constitutes public disclosure. You must let us know if you and your Advisor **do not** wish your abstract to be posted on the web page.

Obtaining a Thesis Presentation Abstract Template

1. Send an e-mail to Eleanor.Gorman@jefferson.edu. In the "subject" line put the words "thesis abstract." You need not put anything in the body of the message. Ms. Gorman will reply to you and will attach a Microsoft Word template. The template will be called "ThesisAbstract.doc". The document will be set as "read only," which means that you can open the file but cannot modify it.
2. To work with the file, open it. Once it is open save it under a different name on your computer. In other words, use the "File|Save As" function from the toolbar. When prompted, give the file a new name. It will be saved on your computer without read/write restrictions. **Do not** change any settings on this file except for its name.
3. If you think you have done something to "ruin" your working copy of the template file, simply repeat No. 2 above to generate a new copy.
4. If you do not have e-mail, or if your e-mail server cannot handle attachments, bring a CD or flash drive to Room M-46, Jefferson Alumni Hall. Ms. Gorman or someone else will copy the template onto your media.

Title Information

- Capitalize the entire title.
- List the authors' names: Use initials without periods for first and middle names, not full names.
- The **only names** on the abstract should be your name (underlined), and your thesis advisor.

- Provide departmental and institutional affiliations for you and your advisor as per the example on **Page #14**.

Abstract Proper (Body of the Abstract)

- Organize the body of the abstract in this fashion:
 - A statement of the study's purpose (one sentence);
 - A statement of the methods used;
 - A summary of the results obtained, presented in sufficient detail to support your conclusions;
 - A statement of the conclusions reached. Note that it is **not** satisfactory to state, for example, that "the results will be discussed," or that "other data will be presented."
- The entire body of the abstract, *i.e.*, the entire abstract except the Title Information, **must** be in a single paragraph. DO NOT separate "methods," "results," or "conclusions" into separate paragraphs. Figures and tables are not permitted in the abstract.
- See the example on **Page #14**.
- The ENTIRE abstract (Title Information and Body of the Abstract) **MUST** fit into a space 4.5" wide and 7.0" deep when formatted with the 11 point Tahoma font. If your material does not fit, **you** must shorten it. The Office of Graduate Studies **will not** edit your abstract to make it fit the template. You **may not** use a smaller font or a different font in order to make the abstract fit the template.

Submitting the Abstract

Your abstract must be submitted as a computer file in Microsoft Word. You may submit it *via* e-mail or in person *via* a flash drive. Send the file as a file attachment in an e-mail directed to Eleanor.Gorman@jefferson.edu. It is advisable to send a copy to yourself to make sure your e-mail left the server.

Sample Abstract

DIAGNOSTIC POWER OF CIRCULATING TUMOR PROTEINS AND PHYSIOLOGICAL PARAMETERS TESTED IN AN IMMUNODEFICIENT RAT ORTHOTOPIC HUMAN LUNG CANCER MODEL. HJ Millar-Quinn¹, E Wickstrom²

¹Discovery Research, Centocor R&D, Inc., Radnor PA.

²Department of Biochemistry and Molecular Biology, Thomas Jefferson University, Philadelphia PA.

Clinically relevant animal models of human cancer that allow tumor growth and metastasis to closely mimic that of human disease are necessary for the evaluation of putative therapeutics. Presently, there are no animal models for human lung cancer that both mimic human disease and show clinically relevant protein biomarker activity. It is hypothesized that circulating levels of lung cancer-associated proteins will correlate with physiological measurements from an orthotopic H460 human non-small cell lung carcinoma (NSCLC) model in immunodeficient rats. An orthotopic lung cancer model was developed in the nude rat, using intratracheal instillation of H460 cells. In-life measurements, blood gas, and blood analytes from naïve and tumor-bearing animals were measured over time. Serum samples were collected from these animals to quantitate circulating human IL-8, p53, VEGF, and MMP-9, which were correlated with in-life measurements to track disease progress. MMP-9 and p53 were not significantly detectable in the serum. Circulating human VEGF was detected at high levels on the day of death in some of the tumor-bearing animals. Human IL-8 was detectable in all tumor-bearing animals and showed correlations with markers of respiratory acidosis (pH, $P=0.012$; TCO_2 , $P=0.024$; PCO_2 , $P=0.007$; and HCO_3 , $P=0.029$), and with surface body temperature ($P=0.001$). IL-8 significantly correlated with survival ($P<0.001$), indicating an association with tumor burden. Circulating IL-8 may be a useful clinically-relevant tumor protein marker, due to its correlation with multiple physiological parameters associated with disease progression, which is consistent with the original hypothesis.

SAMPLE ABSTRACT

The final copy of the Research Thesis and the form on the next page, signed by the members of the Thesis Committee, must be submitted on the day of the presentation to the Office of Graduate Studies in JAH M-46.

JEFFERSON COLLEGE OF GRADUATE STUDIES

THOMAS JEFFERSON UNIVERSITY

SIGNATURE SHEET

Student _____

Candidate for the degree of

Master of Science

Has successfully completed the final copy of the Master's research thesis in the field of

	Biomedical Sciences
	Cell & Developmental Biology
	Microbiology
	Pharmacology

We have found that the candidate has successfully completed the requirements for the Master of Science Research Thesis thereby demonstrating knowledge of the skills needed to contribute to the scientific validation of his or her practice.

Name

Date

Guidelines for Preparing for the MS Oral Thesis Presentation

The Jefferson College of Graduate Studies will provide a computer, laser pointer, and digital projector for the MS Thesis presentations. You must adhere to the following guidelines:

1. Presentations must be done in Microsoft PowerPoint. The computer provided runs the Office 2003 version of PowerPoint and is backward compatible to previous versions.
2. PowerPoint files should be submitted as an attachment in an e-mail addressed to:
Eleanor.Gorman@jefferson.edu
3. If the files are too large for e-mail you may submit your presentation on a CD or *via* a flash drive in person at the Office of Graduate Studies (JAH M-46).
4. PowerPoint files must be in our possession at least ***two (2) business days*** before the date of your presentation to allow us to load your presentation on our computer and check it for problems. We will acknowledge the receipt of your files *via* e-mail.
5. If you generated your PowerPoint slides on a Macintosh computer please load them on a Windows-based machine, convert them to the Windows version of PowerPoint and make sure the fonts, table and graphs have all converted properly. This is especially important for special characters and symbols.
6. If you are presenting movies embedded in your PowerPoint slides, please make sure we have the same software program available on the presentation computer, *e.g.*, Windows Media Player, Quicktime, *etc.*

NAME: _____

MILESTONE STAGE CONTRACT AND CHECKLIST

CHECK OFF	ACTIVITY	DATE	STUDENT INITIALS	ADVISOR INITIALS
	Identify thesis advisor			
*	Initial Thesis Project Milestone Contract: 1 Copy for student + 1 copy for the files in M-46			
	Select members of the Thesis Committee			
	Submit written proposal for thesis project			
	Additional approvals as needed:			
	Intellectual Property			
	IACUC (Animal Use)			
	IRB			
	Oral presentation of thesis proposal to Thesis Committee			
	Approval of thesis proposal: First official action of the Thesis Committee			
	Thesis Committee Meetings:			
*	Meeting #1			
*	Meeting #2			
*	Meeting #3			
	Prepare rough drafts of thesis for committee review			
*	Revisions if necessary & <i>Final approval of thesis</i>			
	Check with JCGS Office (M-46) to insure all records are current and all course requirements have been fulfilled prior to handing in the thesis			
	Schedule formal presentation of thesis (April, July, November)			
	Submit abstract to JCGS Office (M-46): This is usually 30 days prior to the actual presentation date			
	Formal presentation of Master's Thesis			
*	Submit a final bound copy of thesis along with signature page to JCGS Office (M-46).			

*** THIS CONTRACT IS REQUIRED TO BE HANDED IN FOLLOWING EACH HIGHLIGHTED EVENT AND WITH THE FINAL BOUND COPY OF THE THESIS**