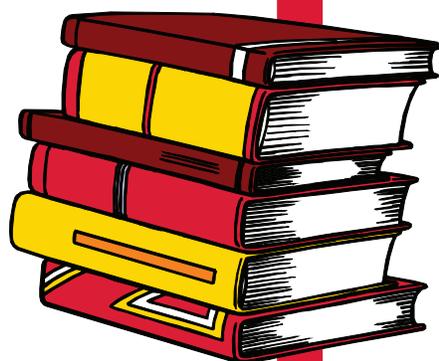


INSIDE:

- PARTNERS' NEWS
- BIOMET HAPPENINGS
- MPOWER UPDATE
- BITS AND PIECES
- PUBCENTRAL AND RPPR



BIOMET
SCIENTIFIC PROGRAMS

LABORATORY OF
MOLECULAR CARDIOLOGY

LABORATORY OF
NANOBIOLOGY

LABORATORY FOR
NEURODEGENERATIVE DISEASES

LABORATORY FOR
PRION DISEASES

PROGRAM IN
CANCER BIOLOGY

PROGRAM IN
CELL STRUCTURE AND
DEVELOPMENT

PROGRAM IN
MITOCHONDRIAL DYNAMICS



UNIVERSITY of MARYLAND
SCHOOL OF MEDICINE

BioMET

Center for Biomedical Engineering and Technology - University of Maryland School of Medicine
in conjunction with the Fischell Department of Bioengineering, School of Engineering, University of Maryland, College Park

Editor's Note

This issue is dedicated to some informational topics that I hope readers will find useful. While other newsletters have had similar articles, I have never dedicated an entire issue to them. I hope readers will feel free to suggest more topics, if they find these articles useful.

What Goes Into a Thesis?

Nearly everyone in the laboratories has or will be writing a thesis or dissertation, scientific paper, and/or grant proposal. The University's School of Medicine has several useful classes to help the novice to begin the process. For example, there are both long and short courses or workshops on grant writing (http://medschool.umaryland.edu/career/grant_writing.asp) and on writing a research paper (http://medschool.umaryland.edu/career/res_paper.asp) organized by the Research Career Development Program. The courses are free and everyone from graduate students to junior faculty members can take the courses. Since writing is a critical skill for scientists, making use of this opportunity is strongly encouraged.

What does not seem to be available is any information on what belongs in a thesis. There is a thesis and dissertation style guide (<http://www.graduate.umaryland.edu/documents/Electronic%20Thesis%20and%20Dissertation%20Style%20Guide%202013.pdf>), but this only discusses fonts, pagination, margins etc. It says nothing about content or what information should go where. In this article, I will try to give a generic outline of the content of a thesis or dissertation.

CONTINUED PAGE 3

Early Career Transitions

Training in the sciences does not end with a thesis. That is just the first step in a scientific career. Too often the intensity of just mastering a complex body of knowledge and then adding to that knowledge with one's own project in an academic setting leaves a trainee unprepared for a career in research. Most newly minted PhDs will go on to postdoctoral fellowships. This is supposed to be a step toward independence. However, this position, too, can focus only on the research and ignore career issues. Given the difficulties in research funding, the limited academic opportunities and the non-academic nature of industrial scientific careers, many trainees find themselves floundering to make a living in research after their postdoctoral experience. Many may have missed or ignored opportunities to learn about the *business* of science and what a *career* in research actually entails.

UMB, along with many other universities, is aware of the issue of career development. The Research Career Development Program in the School of Medicine is one response

CONTINUED PAGE 2



Accelerating Innovation and Discovery in Medicine (ACCEL-Med), a new initiative of the University Of Maryland School Of Medicine was launched on November 22, 2013 with the first "Festival of Science" symposium (see <http://somvweb.som.umaryland.edu/absolutenm/templates/?a=2566&z=41>). The new initiative includes a distinguished Scientific Advisory Council, including UMBI founding President, Dr. Rita Colwell.

Congratulations to Fischell Department of Bioengineering Professor John Fisher and Fischell Fellow Anthony Melchiorri who won the Best Inventor Pitch at the 2013 Professor Venture Fair. Dr. Fisher is a former BioMET retreat speaker.

CAREER CONTINUED

to the lack of career planning within the usual PhD training experience. However, it is voluntary. Postdoctoral fellows and junior faculty members are under no obligation to take advantage of the programs. Too often, early careerists focus so much on just getting the research done that any discussion of career plans goes in one ear and out the other! Those that do so will find themselves losing out to those who, for whatever reason, have done their career homework.

A recent article in *The Physiologist* entitled "Moving from trainee to Junior Faculty: A Brief Guide" by Donald E. Kohan is an excellent starting point to begin to think about a career in academic research¹. There are probably similar articles on non-academic careers, but this author had problems finding them. There were a number of articles, however, on the need to look at different career paths. One in particular by Sauermann and Roach noted that academic PhD mentors often only advise their students on pursuing academic careers, especially in the life sciences² but that interest in such a career wanes over the training period. They suggested, "To the extent that the strong interest in a faculty career at the beginning of the PhD reflects a lack of information about the challenges and job prospects of faculty careers, providing such information to applicants prior to enrollment in the PhD may allow them to more accurately evaluate the costs and benefits of pursuing a PhD."

Their statement presupposed that career planning is of sufficient interest to trainees that they will spend effort on it. No one seems to have studied the extent to which trainees actually plan their careers. Having information available does not mean that information will be used. In the experience of this author, it is rare to have a graduate student who is actively engaged in career planning. Postdoctoral fellows are a little more likely to actively plan a career, but a significant portion of those tend to put it off until their funding is running out, and they are forced to take the next career step. Since career planning is not part of the curriculum, trainees tend to dismiss it as something to be done whenever.

Research, particularly academic research, is really very entrepreneurial and requires strong self-discipline and time management. Kohan suggested that "a research career involves three main mental attitudes: passion, acceptance of risk, and perspective." (p3). This author would add perseverance and fortitude. To maintain these attitudes, trainees need to have a good understanding of exactly what *doing science* entails as a life-long pursuit. Lab experiments are fun and exciting, but to do them as a career requires doing the un-fun things like writing grants and administrative duties. Every trainee has to ask him-or herself, "What am I willing to do to pursue my research goals?" If they are honest with themselves, the answer might be surprising.

If you would like a copy of the Kohan paper, please contact the editor.

¹Kohan, D. 2014. Moving from trainee to Junior Faculty: A Brief Guide. *The Physiologist* 57(1): 3-6.

²Sauermann, H., Roach, M. 2012. Science PhD Career Preferences: Levels, Changes, and Advisor Encouragement. *PLoS One* 7(5):e36307.

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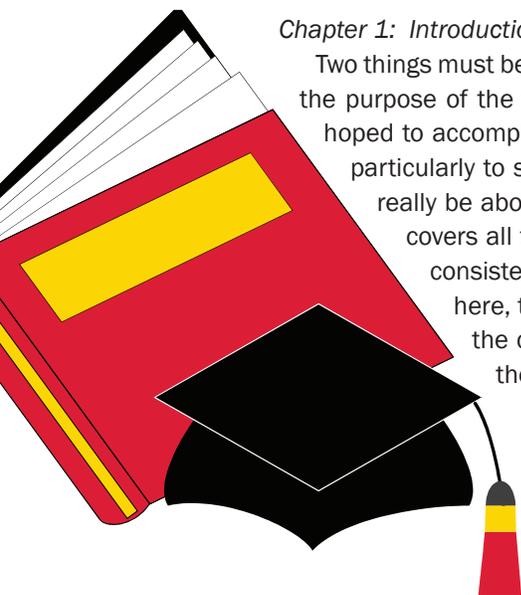
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There will be some variation depending upon the research area and individual committee suggestions, but for the most part the information in one thesis is structured or presented the same as any other thesis.

Every thesis will have 4-6 chapters. Since the first chapter and the last will be the same for every thesis, it is the middle chapters that might vary from 2-4, with 2 being unusual, and 3 and 4 being common. The basic content is as follows: Chapter 1: Introduction and Background; Chapter 2: Methods; Chapters 3-4-(5): Results; and Chapter 5-(6): Overall Discussion, Summary and Future. This structure should sound similar to a scientific paper. The differences will be discussed below.



Chapter 1: Introduction and Background

Two things must be included in this chapter. There should be a 2-4 page Introduction that discusses the purpose of the thesis, the overall hypothesis of the work and the general approach—what you hoped to accomplish with this work. Briefly going over the organization of the thesis would help, particularly to set up the background information. This would have few references, if any, and really be about you and your thesis. The second thing is a review of the literature; one that covers all the areas of work to be discussed. The order of the topics discussed should be consistent with the overall organization of the thesis. In addition, you have two options here, the overall introduction could be a separate section or it could be included under the chapter heading. Then the first chapter would be a true Background/Review of the Literature. Either organization should be acceptable.

Chapter 2: Methods

This chapter is should cover in detail every technique, solution, procedure and piece of equipment used. The detail should be sufficient that anyone could duplicate the work you have done. Sources of chemicals, equipment brands or suppliers, and models used should be noted. The exact recipes for solutions should be included as well. If you have written protocols, these could be included in lieu of a new written description.

Chapters 3-4-(5) Results

The order of the results chapters should reflect the order outlined in the thesis introduction and carried through the background. Ordering the ideas, and being consistent with that order, ties the entire thesis together and allows the reader to follow the progression of your work.

These chapters are written as if they are scientific papers. In fact, they could have already been published as papers, if you were the first author or second author with equal standing. It is usually permissible to insert a reprint of such a paper as a completed chapter. There could also be submitted manuscripts or manuscripts ready for submission. In that case, the submitted version could be used. In any case, these chapters have the same structure as a scientific paper: Introduction, Methods, Results, and Discussion. It is expected that the Introduction and Methods sections will duplicate parts of Chapter 1 and 2 of the thesis. The Results section, however, is the strictly descriptive form to be found in a scientific publication. The Discussion as well would follow the paper-style of discussion. You would not be expected to refer to other sections of the thesis. The expectation is that each results chapter would tell a complete research story, though this may not always be the case.

In general, a thesis includes 2 or 3 “completed” but related projects. Since you would hope to eventually publish your results, these chapters outline the papers expected to come out of your work. Your committee might want you to include a short discussion of what future work an individual chapter might suggest. However, that is really a committee issue.

Chapter 5-(6) Discussion

While each of the results chapters would have a discussion, it would only relate to that particular chapter. This discussion is about the thesis, overall hypothesis, and the compiled work, combining and relating the discussions from the previous chapters. This chapter answers the following questions, though others are possible: What did you discover? What broad areas are affected by your results? What do your results suggest for future work? This chapter should conclude with a summary statement(s) of your overall findings.

This covers 99.9% of all theses or dissertations. It should be noted, however, that this organization still requires good basic writing skills (grammar, punctuation, spelling, and word usage), consistency in nomenclature and formatting, and clearly stated and well supported ideas. It would also help if you got into the habit of reading what you write! Correcting the simple errors before you send it to your committee will save you both embarrassment and an irritated committee.

If you would like a pdf version of this article, please contact the editor.

BIOMET HAPPENINGS

Publications

Makarava N, Baskakov IV. The evolution of transmissible prions: the role of deformed templating. *PLoS Pathog.* 2013 Dec;9(12):e1003759.

Clerc P, Ge SX, Hwang H, Waddell J, Roelofs BA, Karbowski M, Sesaki H, Polster BM. Drp1 is dispensable for apoptotic cytochrome c release in primed MCF10A and fibroblast cells but affects Bcl-2 antagonist-induced respiratory changes. *Br J Pharmacol.* 2013 Nov 11. [Epub ahead of print]

Li H, Zhong Y, Wang Z, Gao J, Xu J, Chu W, Zhang J, Fang S, Du SJ. Smd1b is required for skeletal and cardiac muscle function in zebrafish. *Mol Biol Cell.* 2013 Nov;24(22):3511-21.

Grants and Contracts

Awards

Dr. W. Jonathan Lederer, 12/1/13, NIH-NHLBI, "Stretch-Dependent Calcium Signaling in Heart," \$337,500, yr 4 of 5.

Dr. W. Jonathan Lederer, 12/1/13, NIH-NHLBI, "Decreased Cholinergic Tone and Mitochondrial Dysfunction in Heart," \$53,668, yr 3 of 3.

Dr. Shengyun Fang, 12/1/13, NSF, "Regulation of the ER-associated Degradation by Importin Beta," \$238,662, yr 2 of 3.

Submissions

Dr. Bruce A. Vogel, 11/15/13, NIH, "The role of an extracellular matrix in cytokinesis," Total Request: \$1,109,252.

Dr. Didier X. Brochet, 11/18/13, NIH, "Mechanisms of Arrhythmogenesis in Aging," Total Request: 422,125.

Dr. W. Jonathan Lederer, 12/12/13, University of Strathclyde, "Stretch-dependent signaling in cardiac fibroblasts," Total Request: \$99,184.

Talks and Travels

Dr. Mervyn Monteiro, grant reviewer, NIH Study Section, F31/F32 fellowships Study Section: ZRG1 F03A-N (20) L, Bethesda, MD, November 18-19, 2013.

Dr. W. Jonathan Lederer, invited speaker, "Tugging on the Heart Strings: A New Calcium Signaling Pathway in Heart," Krasnow Institute for Advanced Study, George Mason University, Fairfax, VA, 12/2/2013.

Mpower Update

Editor's Note: While BioMET may not participate in all activities relating to the new initiative, the success of the entire enterprise benefits everyone. Thus, all activities of the new initiative will be highlighted in BioMET Now. As before, all members of the BioMET community are encouraged to look at the Mpower web site at mpowermaryland.com for current information.

Mpowering the State announced a new director for the Institute for Bioscience and Biotechnology Research (IBBR) is a joint research enterprise between the University of Maryland College Park, The University of Maryland Baltimore and the National Institute of Standards and Technology. IBBR was the successor to UMBI's Center for Advanced Research in Biotechnology at Shady Grove. The announcement of the appointment of Dr. Thomas Fuerst, who has a significant background in industry and government research, was made in November. More information can be found on the Mpowering web site listed above.

Bits and Pieces

-BioMET's annual Thanksgiving Potluck was held November 25.

-The construction of the new space in the General Research Building continues on track. Occupation is expected early next year.

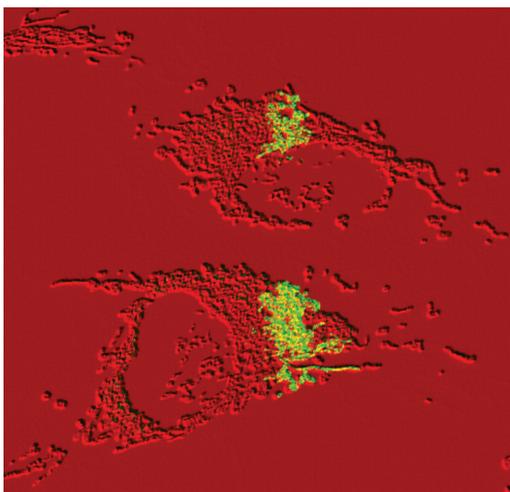
-Dr. Lederer's move to Pharmacy South is still on hold. They will be testing a new vibration table currently on order.

PubCentral and RPPR

With the new reporting system for non-competing renewals instituted by NIH (RPPR), PubCentral is linked directly to the reports. That means that publications are coming up within the reporting system for you to link to the grant, if they have not already been linked via PubCentral. Funding is being held up until PubCentral issues are resolved.

There are a number of issues with this linkage. The biggest issue seems to be the lag time from when journals actually place the article in PubCentral and when RPPR lists a publication on a particular grant. Each publication must be dealt with in some way for funding to go through. There are several ways to manage the process. One possible way would be for corresponding authors to upload the accepted version of the manuscript, before final edits. Grants can then be linked to that manuscript ahead of publication. The linked grants should include any grant listed in the acknowledgements. PubCentral allows you to search for your co-authors' funding, so it is easy to link the grants to the manuscript. PIs are asked to sign off in PubCentral when you do this. When the journal finally gets around to contacting PubCentral, authors receive messages saying that there is a duplication in the system. This seems like an error, but PubCentral is just culling its files.

It is up to you to identify which publication acknowledges which grant. If there is no acknowledgement than it should not be listed in either PubCentral or RPPR. If you put it in your report, however, it must be in PubCentral, whether you formally acknowledged the grant or not..



Imaging
Mitochondria
by Mariusz
Karbowski