THE UNIVERSITY OF UTAH

October 3, 2013

Vivian S. Lee
Senior Vice President for Health Sciences
5th Floor, CNC
Campus

RE: Graduate Council Review
Department of Pathology

Dear Vice President Lee:

Enclosed is the Graduate Council's review of the Department of Pathology. Included in this review packet are the report prepared by the Graduate Council, the Department Profile, and the Memorandum of Understanding resulting from the review wrap-up meeting.

After your approval, please forward this packet to President David Pershing for his review. It will then be sent to the Academic Senate to be placed on the information calendar for the next Senate meeting.

Sincerely,

David B. Kieda
Dean, The Graduate School

Encl.

XC: Peter E. Jensen, Chair, Department of Pathology
David J. Stillman, Head, Division of Microbiology and Immunology
JoAnn P. Fenn, Head, Division of Laboratory Science
Julio Delgado, Assoc. Head, Division of Laboratory Science

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The Graduate School – The University of Utah

GRADUATE COUNCIL REPORT TO THE SENIOR VICE PRESIDENT FOR HEALTH SCIENCES AND THE ACADEMIC SENATE

April 29, 2013

The Graduate Council has completed its review of the **Department of Pathology.** The External Review Committee included:

For the PhD Program within the Division of Microbiology and Immunology

Andrea J. Sant, PhD
Professor, Department of Microbiology and Immunology
University of Rochester Medical Center

Jeremy M. Boss, PhD
Professor and Chair, Department of Microbiology and Immunology
Emory University School of Medicine

For the Medical Laboratory Science (MLS) Division

Vicki S. Freeman, PhD
Professor and Chair, Department of Clinical Laboratory Sciences
University of Texas Medical Branch

The Internal Review Committee of the University of Utah included:

Cynthia J. Burrows, PhD
Distinguished Professor
Department of Chemistry

Angela Deneris, CNM, PhD
Professor, Clinical
College of Nursing

Charles B. Grissom, PhD
Professor
Department of Chemistry

This report of the Graduate Council is based on the Self-Study submitted by the Department of Pathology, the Reports of the Internal and External Review Committees, the OBIA profile, and the Department Chair's letter dated January 9, 2013 in response to the Internal and External Review Committee Reports (co-signed by Senior Vice-President and Dean of the School of Medicine Vivian Lee).

DEPARTMENT PROFILE

Program Overview

The Department of Pathology is located in the School of Medicine and is a hybrid of clinical and basic science faculty. Within the Department of Pathology there are five divisions - Clinical Pathology, Anatomic Pathology, Pediatric Pathology, Microbiology (Cell Biology) and Immunology, and Medical Laboratory Science. The Associated Regional and University Pathologists, Inc. (ARUP) is a strong partner in supporting the Medical Laboratory Science (MLS) program.

The Chair of the Department, Dr. Peter Jensen, is a nationally recognized leader who seeks to develop the Department of Pathology into one of national prominence. A new plan to form an interdepartmental collective (with potential new hires within the Department) will focus on Immunology and Infectious Disease and Inflammation. This focus can help the Department develop a clear scientific identity nationally and encourage truly synergistic interactions. This effort would also help the issue of sustainability.

The School of Medicine's Department of Pathology [hereinafter the "Department"] has two divisions that offers 4 degree programs evaluated in this review, as listed below.

Division of Medical Laboratory Science (hereafter described as the MLS)
- BS Program in Medical Technology (MT), also called Medical Laboratory Science
- BS Program in Cytotechnology (CT)
- MS Program in Laboratory Medicine and Biomedical Science (MS)

Division of Microbiology and Immunology
- PhD Program in Microbiology and Immunology (MI)

Under the organizational headers of this report, the degree programs are generally presented in the order listed above, using the indicated abbreviations.

Division of Medical Laboratory Science (MLS)

MT – The MT BS program is accredited by the National Accrediting Agency for Clinical Laboratory Sciences, and students must successfully pass the MLS Comprehensive Exam at the end of the degree program. Program goals include providing graduates with entry level

competencies for the clinical laboratory as well as providing students an avenue to grow professionally as a member of the health care team. Traditional students routinely enter the program during their junior year in college (2 + 2); however, it takes most students five years to complete the curriculum, as many work part-time. A post-baccalaureate option was introduced into the MLS Program in 2004 (4 + 1) to accommodate graduates with a previous bachelor's degree in biology, chemistry or microbiology.

CT – The CT BS program is accredited by the Commission on the Accreditation of Allied Health Education Programs (CAAHEP). The program was declared 'Inactive' (Accreditation Status) for two years, 2005 and 2011, in order to evaluate the curriculum (particularly to develop some molecular content) and to refocus on student recruitment. The program is now active and is one of three active programs in 13 western states and accepts 4 students/year. Following completion of the program, students are eligible to sit for the American Society of Clinical Pathologists (ASCP) Board of Certification. Students typically enter the program during their senior year of college after completing 21 semester hours of prerequisites and complete the program in 1 year.

MS – The MS graduate program objectives include increasing student technical competence and helping them to understand and carry out a research project, with sufficient preparation to continue on to a PhD or medical school program if they desire.

Division of Microbiology and Immunology

MI – In the MI PhD program in basic science, students participate in formal coursework, the Division's Research-in-Progress (RIP) and Journal Club seminar programs, and original research projects in cellular and molecular immunology, microbial pathogenesis, regulation of gene expression, basic cell biology and related areas. The Department recognizes opportunities for synergistic activities with both Huntsman Cancer Institute and Primary Children's Hospital. Several current faculty members collaborate in the area of cancer research and helped establish the Pathology Research and Translational Oncology Core Facility at HCI.

Faculty

Each degree program involves a different hybrid of clinical and basic science faculty.

Division of Medical Laboratory Science (MLS)

JoAnn Fenn is the Division Head for MLS that currently consists of 4 faculty members plus one additional vacant faculty position (yet to be filled) and one currently in phased retirement.

MT – Normally, five full-time faculty teach the MLS didactic and student laboratory courses (4 of the 5 are Professors; none are tenured). Other faculty from the Department and the professional community assist with guest lectures. In addition, one full-time and one part-time

staff person support faculty and students in the laboratory sessions. There are ~ 20 clinical teaching technologists who coordinate the students' clinical training in each of their respective disciplines at the clinical facilities. The average age of the Department of Pathology MLS faculty is 53.6 years (age range is 33-66). The Department of Pathology follows University guidelines for promotion and tenure. The director for the MT program is Dr. Karen Brown.

CT – The undergraduate Cytotechnology program currently has a total of 1.5 FTEs in faculty lines: Michael Berry (1.0 FTE), who also serves as the Program Director; Barbara Chadwick, M.D., Medical Director (0.25 FTE); and Denise Smith, Ph.D., ARUP Cytology Scientist (0.25 FTE).

MS – Pathology faculty teach students in the graduate courses and serve as research mentors and thesis committee members. Concern was expressed by the students and faculty about finding "tenured or tenure-track" faculty to serve as thesis committee chairs. Co-directors of this degree program are JoAnn Fenn and Dr. Julio Delgado.

Division of Microbiology and Immunology

MI – The Division has 15 tenured or tenure-track faculty members, 4 research-track faculty members and 8 adjunct faculty members, all of whom make significant contributions to the MI PhD program. The faculty members are highly active in research, typically with 1-2 NIH grants per faculty member, steady publication rates, and visibility at conferences. Faculty members report a high level of morale and general satisfaction with the direction of the department. Future plans include recruitment of 3-4 additional tenure-track faculty members with a focus on immunology and on molecular and translational pathology.

Future hires will include a balance of mechanism-driven research and areas of potential impact to clinical programs; it is recognized that a disease focus is advantageous to both federal funding and other fundraising activities.

The director of the MI program is Dr. David Stillman.

Students

Division of Medical Laboratory Science (MLS)

The MLS has ~ 80 undergraduate and ~ 20 master's level students. Student recruitment information and applications are on the program webpages. Students often find out about the degree programs through web searches or word of mouth (informal polling of current students).

MT – Two types of students are accepted into the MLS Undergraduate Program. Individuals with a minimum of 41 hours of prerequisites are accepted into the BS degree program. The other group is composed of individuals with BS degrees in the basic sciences such as biology, chemistry, and microbiology who have the option to enter the post-graduate

certificate program or obtain another BS degree. For Fall 2012, there were 42 first-year MT students and 30 senior MT students enrolled in both the traditional and post-baccalaureate programs. The students are very complimentary of the MT program and program of study. They find the faculty to be individually very responsive to their input and approachable about academic concerns. Many students reported that they work for ARUP. If the student works 20 hours per week for ARUP, the company pays their full tuition. Students enjoy flexible work hours there and have increased work opportunities after graduation. Upon degree completion, the students find positions in clinical or basic science research laboratories.

CT – The CT program currently has four students that form a close, supportive group. The students are very complimentary of the CT program and faculty. Students generally need to have a strong biology background in order to complete the program in a timely manner. Upon completion, the students generally find positions in cytotechnology laboratories.

MS – Student applicants must have a BS degree with a certification in Medical Technology, Clinical Laboratory Science, or a BS degree in another basic science (and provided they have met appropriate prerequisites). Of the 30-40 yearly applications to the program, 8-10 students are accepted and 6-7 graduate. Although the program of study is two years, most students are part-time and "internal," i.e., working in ARUP clinical or research laboratories or other local hospital laboratories, thus typically requiring three years to graduate. Upon completion, students find positions in clinical or basic science research laboratories and some continue for higher levels of education (i.e., doctorates or medical school).

Division of Microbiology and Immunology

MI – Graduate students (~ 5 per year), are recruited primarily through the Molecular Biology Program and secondarily through either the Biological Chemistry Program or the MD/PhD program. Traditionally it has been difficult to recruit students from most campus-wide departments because students have had little exposure to immunology in their previous curricula. A fall term "Open House" event with posters and talks on the exciting research opportunities in microbiology and immunology is a possibility to raise the program's visibility. Most students take an average of more than 6 years to complete the PhD.

The current graduate students are a congenial group who report a high level of satisfaction with the program. Students are eager to publish their work and find a supportive environment in Journal Clubs and Research in Progress seminars. A few student suggestions for program improvement included:

- more interaction with ARUP and an expanded view of clinical applications of their basic research
- more career guidance and guest speakers from allied paths (clinical, pharmacy, law, regulatory agencies, etc.)
- a uniform set of program degree guidelines in a handbook or on a website.

Curriculum

Division of Medical Laboratory Science (MLS)

MT – The curriculum is a combination of (a) didactic classes covering all aspects of laboratory medicine and (b) clinical rotations that provide students with the practical aspects of what they learn in their didactic classes. The two-year curriculum is well delineated and students have a part-time option for progression through the program.

CT – The one-year CT program consists of lectures, demonstrations and conferences, as well as clinical rotations. It is the only accredited program of its kind in the Intermountain West. The curriculum is well delineated and students have a part-time option for progression through the program. Following successful completion of the program, graduates are eligible to sit for the ASCHP Board of Certification Examination in Cytotechnology.

MS – A minimum of 30 semester hours are required for graduation, which include 6-10 hours of Thesis Research and 6-10 hours of approved electives. A recent review of the program has begun and some changes will include the addition of new electives. The curriculum is well delineated and students have a part-time option for progression through the program.

Division of Microbiology and Immunology

MI – The core MI curriculum is formal coursework in the parent fields of microbiology and biochemistry. Major components of the graduate program include laboratory research and the seminar program of twice weekly for Research-in-Progress (RIP) and Journal Club (JC) presentations by graduate students. Through the seminar venue the students feel that all of the faculty become familiar with their (student) research projects as well as their scientific capabilities. The JC program was recently improved to provide more faculty oversight of topic discussions, with more feedback given to students after their presentations. The preliminary examination is taken in the 2nd year. Students are required to serve as a Teaching Assistant for one semester, typically in their 3rd year.

Recent NIH training grants in Microbial Pathogenesis as well as in Genetics have been an asset to the doctoral and post-doctoral students. There was interest in a proposal to create a one-year research option for MD students that could give medical students greater insight into current research initiatives in microbiology and immunology and could also benefit research programs by adding a strong student to the laboratory for one year. However, a funding mechanism would need to be identified for such a program.

Diversity

Student Diversity

In all of the Department programs, there are very few ethnically diverse students -- as is typical across the Health Science campus at the University of Utah. For example, in the MS program, currently there are two African American students and one Hispanic student enrolled out of 23 students. There has typically been some increased diversity through international students. The Department recognizes the need to reach out to different communities, yet the recruitment of a diverse student body remains a challenge.

Faculty Diversity

MLS – The MLS faculty report there is not significant ethnic diversity within their ranks; however, there is good representation of gender and educational background. Recently a "Women in Pathology" group (supported by the American Society of Microbiology) was formed and 42 women attended their second meeting this year. In the MS program, out of 31 faculties participating in the program, 16 are male and 15 are female. Twenty-seven out of 31 faculties are Caucasian, two are Asian, one is African American, and one is Hispanic/Latino. Both African-American and Hispanic faculties were recruited since the last review.

MI – The Division of Microbiology and Immunology consists of 22 male and 5 female faculty members. Among the tenured/tenure-track faculty, one is Hispanic, two are Asian, and three are women, indicating that diversity is good, but could be an area of improvement as new hires are sought. The Division has met with Dr. Octavio Villalpando (Associate Vice President for Equity and Diversity), to discuss the diversity issues that face the Department. Attempts to obtain demographic statistics for recent faculty searches were only partially successful (i.e., data are incomplete).

Program Effectiveness and Outcomes Assessment

In all of the Department programs, outcomes assessment generally takes place through some combination of certification scores, job placement, clinical rotation evaluations, employer surveys, and course evaluations. Students evaluate each of their classes through online course evaluations at the end of each semester. Meetings with the ARUP Cytopathology Lab and representatives from the MLS occur occasionally to discuss changes to the program.

Division of Medical Laboratory Science (MLS)

MT – Students all feel they have excellent employment opportunities and are finding employment within six months of graduation. Some students continue with higher education. One year after graduation, students are sent a questionnaire to measure the MT Program's effectiveness and track student success.

CT – Surveys are sent to each CT graduate and employers three months after the hire date. Survey information on employer satisfaction with the CT graduates is used in evaluating the overall effectiveness of the program. Students take the American Society of Clinical Pathologists Board of Registry examination. Although the pass rate was not reported, student performance is utilized to improve the program. Job placements for certified graduates appear to be good, but positions are limited in the Salt Lake City area.

MS – The curriculum supports the students in meeting the goals of graduating as a competent researcher, with skills in scientific writing and data management, and helps them to gain an awareness and knowledge of new laboratory-related technologies. Job placements appear to be good with some students continuing research in ARUP laboratories and others moving to PhD and medical school programs.

Division of Microbiology and Immunology

MI – The completion rate for PhD students is very high, and most students go on to postdoctoral positions at prestigious institutions.

Facilities and Resources

Overall, the School of Medicine has excellent facilities in state-of-the-art buildings. Didactic teaching is located in the Health Sciences Education Building (HSEB) at the University of Utah Health Sciences Campus (UUHSC). Some major clinical laboratory training takes place via rotations at ARUP in Research Park. Excellent laboratory space in the E. E. Jones Medical Research Building houses most of the research groups in the Division of Microbiology and Immunology.

Program Response to Recommendations in Previous Graduate Council Review

Division of Medical Laboratory Science (MLS)

MT – The program has been responsive to the suggested changes by providing clearer expectations for faculty (e.g., RPT), creating a greater sense among faculty that their contributions are valued, and providing better access for students to faculty with timely attention to their academic concerns, and better knowledge of employment opportunities after graduation.

CT – The CT program was not reviewed during the last review cycle, since it was temporarily inactive.

MS – The MS has attempted to positively address previous recommendations in providing better access to faculty with timely attention to their academic concerns and providing students with better knowledge of employment opportunities after graduation. Although a biotechnology track was not added, students have the opportunity to participate in biotechnology

projects. Also, there is a slight increase in the diversity of students in the program (international applicants and underrepresented students), but the number of ethnically diverse students is still small.

Division of Microbiology and Immunology

MI – The MI program responded to the last review with several procedural changes:

- A weekly seminar program to engage both clinical and research participants more fully.
- Identification of growth areas in molecular oncology, immunology and infectious disease, and molecular and translational pathology.
- A more consistent, tightened preliminary examination process.
- Increased faculty oversight of the journal club program.

In addition, the division examined the system of mentoring and chairing the student supervisory committee and concluded that no change was needed.

COMMENDATIONS

Overall the Department programs are healthy and flourishing, with satisfied students, good job placement, appropriate accreditations, and engaged faculty.

Division of Medical Laboratory Science (MLS)

1. MT – The Medical Laboratory Science Bachelor of Science Program in Medical Technology is strong and provides students with an excellent education. The Department of Pathology's financial support is instrumental in the success of the program as well as ARUP's support for clinical rotations. Specific commendations of the program are as follows:

    a. The MT program provides good advising and produces graduates that have no difficulty finding employment. Students are pleased with their program faculty and the personal attention they receive.
    b. There is high faculty morale and recognition that the Department strongly supports faculty growth and development. For example, five faculty were supported to develop curriculum and continuing education in Ghana (summer 2012) through the U's School of Medicine Global Health Initiative.
    c. The MLS Program did not have any deficiencies from the 2009-2010 National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) Self-Study Report Paper Review and subsequent Site Visit. The B.S. Program in Medical Laboratory Sciences received 7 years NAACLS accreditation with no citations.

2. CT – The Medical Laboratory Sciences Bachelor of Science Program in the Cytotechnology

Track is strong and provides students with an excellent training and education. Specific commendations of the program are as follows:

a. This profession provides an important aspect of patient care, and these students are highly employable. Students were very complimentary of their program and the guidance they receive.
b. The CT Program received continuing accreditation from the CAAHEP that applies until 2016. With the partnership with ARUP and continued improvements, this program has the potential to become one of the leading cytotechnology schools in the country.
c. The ARUP Cytopathology Lab provides a well-equipped laboratory for clinical experience coursework.

3. MS – The Medical Laboratory Science Master of Science Program in Laboratory Medicine and Biomedical Science is an excellent program for graduate study in the field. The following specific aspects of the program are to be commended.

a. Students are able to tailor their program of study due to: diverse electives, support from ARUP, and a variety of research areas/topics and opportunities.
b. Students are very complimentary of the program, and they have many professional opportunities after graduation.
c. Faculty morale is high as they believe their contributions are valued, and they have access to good resources regarding career development and promotion. Diverse educational backgrounds of the faculty help strengthen the program.

Division of Microbiology and Immunology

4. MI - The Division of Microbiology and Immunology is both a highly respected and highly collegial group of faculty who provide an excellent graduate program. The following specific aspects of the MI program are to be commended.

a. The vibrant faculty is productive and has an excellent track record of funding. They are committed to teaching, and there is a strong sense of a supportive academic community, as well as an excellent faculty mentoring program. Strong leadership has promoted exceptional faculty loyalty and expectations that the Department can grow and achieve greater prominence.
b. The Division serves educational needs of medical students and graduate students in many disciplines. Additional training grants also enhance the student experiences and the quality of the research program.
c. Students are enthusiastic about the faculty and their program. In particular, the RIP and journal club are a highlight, with good participation rates and apparent effectiveness.

RECOMMENDATIONS

A recurring theme in several of the Department programs is the length of time to degree completion. Although there are various reasons cited (e.g., students in medical technology work part time, students discover a program late in their preparatory coursework, or other), the Department should devote greater attention to help guide students to timely degree completion utilizing regular supervisory committee meetings and explicit expectations for success outlined to the students early in their programs. In particular, the MI PhD program could use a more detailed process description, as discussed by the Department Chair's response letter.

All of the Department programs should make stronger steps towards diversity in both the student population and in the faculty. This should include revisions to the recruitment and admissions processes. A meeting with Evelyn Gopez (Assoc. Vice President for Inclusion) is recommended in accordance with new guidelines established by the Graduate Council. The use of regular progress reports to the Graduate School should also be considered as a way to encourage the Department to work effectively towards this goal.

The recommendations below are summaries of the internal and external reviews.

Division of Medical Laboratory Science (MLS)

1. MT Program Recommendations:

   a. To increase both numbers and diversity, the program should consider recruiting through the high school Health Science Academy Program and have higher visibility in the basic science courses in the Biology, Chemistry and Microbiology Departments.
   b. The students request more case studies, patient simulations and knowledge of how their professional work will enhance patient care. With the need for more interprofessional collaboration, finding avenues for students to interact with other health professional students would be of value for the program. Additionally, the students would like more instruction on laboratory equipment and equipment troubleshooting (experience employers inquire about).
   c. There is potential to leverage ARUP support with even more student exposure in certain areas, notably flow cytometry (the current program devotes only one day to this topic), balanced by possible reduction in other areas (such as in hematopathology).
   d. The Department may want to invest in a microscope-camera-TV projection system that can be more efficient for teaching larger groups in topics such as cell morphology.

2. CT Program Recommendations:

   a. According to the Self-Study, the CT program director believes a more private office is desirable for student conferences and counseling. We support this recommendation.
   b. The students request more case studies, patient simulations and knowledge of how their professional work will enhance patient care. CT students would also like more interaction

with other MLS students and courses/programs (e.g., cell identification) to foster more interprofessional collaboration. Again, these student requests appear to have merit.

c. Students should have increased input into the program and major decisions that affect their program (via student representation in Departmental matters).
d. The CT field is rapidly changing and nationally looking more towards molecular diagnostics. As this topic is mentioned in the accreditation review, a plan and timeline should be implemented to ensure that the program stays at the cutting edge.
e. The glass slide teaching collections commonly get damaged slides; thus, the program could benefit from the addition of digital images to the slide collection.

3. MS Program Recommendations

a. The University of Utah Graduate School guidelines for student committees place emphasis on tenure-track faculty involvement, and there are corresponding limitations on clinical track faculty chairing a student's thesis committee. Clinical faculty are often responsible for the student's research, particularly at the ARUP Research and Development Institute, and competent to chair the student's research. We recommend that the Department consider amending its rule on graduate committee membership. Another option is to consider switching the requirement of a thesis to a student project.
b. The Department could help address the issue of limited student stipend funds (currently $6,000) to support MS students, possibly through greater development efforts.
c. Students expressed specific concerns with the level and unevenness of the 6900 course, Techniques of Biochemical Analysis in Laboratory Medicine, that serves both fellows and master's level students. Students also suggested that the Scientific Writing course should be a requirement for all MS students (currently it is an elective). These concerns should be attended to.
d. The students could use more communication about the processes for degree completion and when they should take their preliminary examination. A timeline and flowchart outlining the major steps for degree completion should be developed for the students.

Division of Microbiology and Immunology

4. MI Program Recommendations

a. Expectations for what is considered by the graduate program for a PhD degree should be clearly articulated by the graduate program and efforts should be made to shorten the time to complete the PhD degree. Currently the time to degree completion is long relative to national standards. A requirement or process for a thesis proposal could help accelerate student progress and research. This requirement could include components such as more feedback from the supervisory committee to the student; creation of a graduate student handbook with clear listings of requirements and the timetable; and/or financial incentives in terms of stipend or tuition payments.

b. The format of the preliminary exam is to identify a topic completely separate from the thesis area of research and develop an NIH research proposal. Students and faculty found this to be a productive endeavor but that it is too restrictive to identify the exam topic that is completely separate from the area of students' future research. The external reviewers recommended that this arrangement be given further consideration.
c. Several programmatic course suggestions from the review committees include: an early graduate-level depth immunology class as an elective, biostatistics and bioinformatics classes (possibly available through other programs), and opportunities for more student feedback on coursework and on how to improve content/delivery of material covered.
d. Additional recruiting efforts for graduate students in the Division would be desirable, such as an annual "Open House" with poster sessions and free lunch to highlight the programs of the Division.
e. Students are interested in more interaction with ARUP and clinical aspects of pathology, and are also concerned about job placement after the PhD. A Career Day event or occasional seminar speakers from non-academic venues (clinical labs, regulatory agencies, patent law, etc.) could help provide career guidance. With uncertainties about the economy and job market, current graduate students feel they could use advising on career alternatives in basic sciences, or academics including law, pharmacy, etc.
f. More efforts on development and endowed funds could enhance the program in the following ways: a one-year research rotation for MD students (similar to the Hughes program), and endowed chairs that would serve to recruit and retain world-class faculty.

Submitted by the Ad Hoc Committee of the Graduate Council:

Marjorie Chan (Chair)
Professor, Department of Geology and Geophysics

Robert Mayer
Professor, Department of Family and Consumer Studies

Sean Redmond
Associate Professor, Department of Communication Sciences and Disorders

DEPARTMENT OF PATHOLOGY	2005	2006	2007	2008	2009	2010	2011
FACULTY: With Doctoral Degrees Including MFA and other terminal degrees							
Full Time Tenured Faculty	25	24	25	27	27	27	24
Full Time Tenure Track Faculty	8	8	10	11	13	12	19
Full Time Auxiliary Faculty	31	36	39	43	44	44	40
Part Time Auxiliary Faculty	3	3	4	3	3	3	4
With Masters Degrees							
Full Time Tenured Faculty	0	0	0	0	0	0	0
Full Time Tenure Track Faculty	0	0	0	0	0	0	0
Full Time Auxiliary Faculty	2	2	2	2	2	2	4
Part Time Auxiliary Faculty	1	0	0	0	0	1	1
With Bachelor Degrees							
Full Time Tenured Faculty	0	0	0	0	0	0	0
Full Time Tenure Track Faculty	0	0	0	0	0	0	0
Full Time Auxiliary Faculty	1	1	1	1	0	0	0
Part Time Auxiliary Faculty	0	0	0	0	0	0	0
Total Headcount Faculty							
Full Time Tenured Faculty	25	24	25	27	27	27	24
Full Time Tenure Track Faculty	8	8	10	12	14	13	19
Full Time Auxiliary Faculty	34	39	42	46	47	47	44
Part Time Auxiliary Faculty	4	3	4	3	3	4	5
FTE from A-1/S-11/Cost Study Definition							
Full-Time Salaried	17	20	19	19	19	19	19
Part-Time or Auxiliary Faculty	1	0	0	1	1	1	0

DEPARTMENT OF PATHOLOGY	2005	2006	2007	2008	2009	2010	2011
Number of Graduates							
Bachelor's Degrees	21	25	21	29	40	22	24
Master's Degrees	5	7	7	10	4	7	5
Doctoral Degrees	1	6	6	7	4	3	3
Number of Students Based on Fall Third Week Semester Data							
Total Number of Undergraduate Majors	94	108	113	129	132	120	141
Total Number in Masters Program	19	17	21	29	25	23	16
Total Number in Doctoral Program	32	28	26	25	25	27	24
Total Department FTE	551	655	689	716	596	410	402
Total Department SCH	12,230	15,309	16,272	17,049	15,338	11,331	11,176

Financial Information Provided by School of Medicine:

Costs: The following shows costs for the last 7 years for the Microbiology and Immunology (M&I) and Medical Laboratory Science (MLS) Programs:

Division	FY05	FY06	FY07	FY08	FY09	FY10	FY11
M&I	1,285,901	1,380,536	1,648105	1,701,350	1,931,410	2,104, 338	2,168,307
MLS	823,053	917,610	912,512	909,215	994,392	1,057,910	1,119,390

Revenue: The following shows the State Appropriated revenue for all department education programs including graduate programs, BS programs, as well as a substantial amount of teaching in the Medical School and allied Health Science programs and residency programs.

	FY05	FY06	FY07	FY08	FY09	FY10	FY11
State - 6100	1,521,459	1,898,717	2,028,795	2,014,752	2,897,828	2,021,937	2,203,619
Curriculum - 1001	279,688	298,467	314,896	303,302	172,120	161,826	291,367

Faculty Degrees represent total number of degrees awarded per faculty member

Full time faculty is >.75 fte

Memorandum of Understanding
Department of Pathology
Graduate Council Review 2012-13

This memorandum of understanding is a summary of decisions reached at a wrap-up meeting on August 19, 2013, and concludes the Graduate Council Review of the Department of Pathology. Vivian S. Lee, Senior Vice President for Health Sciences; Peter E. Jensen, Chair of the Department of Pathology; David J. Stillman, Head of the Division of Microbiology and Immunology; JoAnn P. Fenn, Head of the Division of Laboratory Science; Julio Delgado, Associate Head of the Division of Laboratory Science; David B. Kieda, Dean of the Graduate School; and Donna M. White, Associate Dean of the Graduate School, were present.

The discussion centered on but was not limited to the recommendations contained in the Graduate Council review completed on April 29, 2013. At the wrap-up meeting, the working group agreed to endorse the following actions:

General Recommendations for all Programs in the Department:

1. **A recurring theme in several of the Department programs is the length of time to degree completion. The Department should devote greater attention to help guide students to timely degree completion.**

   See Recommendations 3d, 4a, and 4b as action items for making improvements.

2. **All of the Department programs should make stronger steps towards diversity in both the student population and in the faculty. The office of Inclusion and Outreach is committed to this goal and may provide useful ideas and strategies in this regard. The use of regular progress reports to the Graduate School should be considered as a way to encourage the Department to work effectively towards this goal.**

   See Recommendations 1a and 4f as action items for making improvements.

Division of Medical Laboratory Science (MLS)

1. **Medical Technologist (MT) Program Recommendations:**

   a. **To increase both numbers and diversity, the program should consider recruiting through the high school Health Science Academy Program and have higher visibility in the basic science courses in the Biology, Chemistry and Microbiology Departments.**

The Department Chair and Division Director are continuing to address recruitment strategies that will increase numbers and diversity in the MT Program. One faculty member oversees recruitment, attends the many freshman orientation sessions on lower campus, directs an introductory course for freshman and sophomore students at the university who want to learn about the MT program and the profession, and maintains relationships with the pre-med advisors on lower campus. Additionally, the Department has developed a recruitment relationship with Snow College. Faculty regularly attend the national Clinical Laboratory Educators' Conference where recruitment ideas and approaches are shared. The Sr. Vice President suggested that the Program work closely with Dr. Evelyn Gopez, Vice President for Inclusion, and Carrie Byington, Director of the Native American Research Internship (NARI) Program, to link into their well-developed and coordinated recruitment efforts for the Health Sciences. Efforts will be made internally to track the effectiveness of these various strategies in order to pick and choose those that are most fruitful for the Program.

b. The students request more case studies, patient simulations and knowledge of how their professional work will enhance patient care. With the need for more inter-professional collaboration, finding avenues for students to interact with other health professional students would be of value for the program. Additionally, the students would like more instruction on laboratory equipment and equipment troubleshooting (experience employers inquire about).

The Division is supportive of this recommendation. Faculty will look carefully at how the case study format is utilized and look for ways to further develop patient simulations. For example, students in their final year will have the opportunity to "shadow" working professionals at ARUP. The Sr. Vice President suggested having a faculty member sit on the Inter-Professional Education (IPE) Area Committee. Both of these initiatives will be pursued by the Program Director. Providing more laboratory instrumentation for the student laboratory sessions is a challenge because of the initial expense of the instruments, service contracts, and reagents, but students are exposed to a variety of instruments during the 18-week clinical rotation at laboratory facilities in the Salt Lake Valley, where they receive hands-on training.

c. There is potential to leverage ARUP support with even more student exposure in certain areas, notably flow cytometry (the current program devotes only one day to this topic), balanced by possible reduction in other areas (such as in hematopathology).

The Program Director and faculty agree with the reviewers' assessment of the importance of flow cytometry and the recommendation that the time be increased. The Program Director has worked with ARUP and the rotation is now expanded to two days – one in hematologic flow and the other in immunologic flow.

d. The Department may want to invest in a microscope-camera-TV projection system that can be more efficient for teaching larger groups in topics such as cell morphology.

The Program is fortunate to have a microscope-camera-TV projection system that is used regularly by several faculty in the Division for projection of microscopic images of blood cells, parasites, molds and yeasts, and urine sediment (the reviewers must not have been aware of this). It was proposed that a new multi-headed system be purchased for use by the hematology instructor. The old multi-headed scope belongs to the School of Medicine and was used for teaching histology as well as for some teaching of the MLS students. Histology is now using virtual imaging and a computer/projection system for teaching and they are not interested in the multi-headed scope system. In further discussion with the MLS hematology instructor, it was decided that this is the direction she will pursue rather than requesting a new multi-headed scope.

2. Cytotechnology (CT) Program Recommendations:

a. According to the Self-Study, the CT program director believes a more private office is desirable for student conferences and counseling. We support this recommendation.

The Chair and Program Director must work within the space constraints and policies of ARUP, and a private office is not available for the small number of students in the Program. However, the Program Director can routinely have private conversations with students in the teaching multi-headed microscope conference room, and all student records and privacy information are locked in filing cabinets in adjacent areas.

b. The students request more case studies, patient simulations and knowledge of how their professional work will enhance patient care. CT students would also like more interaction with other MLS students and courses/programs (e.g., cell identification) to foster more interprofessional collaboration. Again, these student requests appear to have merit.

The Program Director and faculty support the student request and the reviewers' suggestion for more case studies and patient simulations in cytotechnology. As with the Medical Technology Program, case studies can certainly be incorporated more in lectures and laboratory sessions. The Program Director regularly looks for glass slide cases and requires microscope practice. In the future he plans to include the photographs of the College of American Pathologists proficiency samples to boost the number of appropriate cases (50/year). The Program is also looking at creating elective opportunities for students to have more interprofessional collaboration (see Recommendation 1b).

c. Students should have increased input into the program and major decisions that affect their program (via student representation in Departmental matters).

There is agreement with the reviewers' suggestions regarding this. Even with just four students, it is important for them to have avenues for representation and for their voices to be heard. The CT Program will explore the system utilized by the MLS-Medical Technology Program to increase the avenues for input within the cytotechnology student group. The Program Director will follow up on this.

d. The CT field is rapidly changing and nationally looking more towards molecular diagnostics. As this topic is mentioned in the accreditation review, a plan and timeline should be implemented to ensure that the program stays at the cutting edge.

The Program Director/Education Coordinator has completed training modules in molecular diagnostics and has received certification in molecular biology through the American Society for Clinical Pathology. The additional credential is indicated as MB(ASCP). The Program is moving in the right direction toward creating a required course that would provide background in Molecular Diagnostics. This should be in place by June 2014 for the 2014/15 academic year.

e. The glass slide teaching collections commonly get damaged slides; thus, the program could benefit from the addition of digital images to the slide collection.

The Program Director has reviewed the collection and determined how best to replace old or broken slides. Because glass slides are still relevant and working with them provides students with necessary techniques/skills, the Director has created and maintains a database of glass slide case studies (since 2006) of new glass slide additions. This allows him to effectively manage the collection, and he has received support from the ARUP cytopathology laboratory personnel to spend time to put the glass slide teaching sets together from patient cases after the slides have been pulled from the archive glass slide files. The Director will investigate building and maintaining online access for the wider community to help build prominence of the collection.

3. MS Program Recommendations:

a. The University of Utah Graduate School guidelines for student committees place emphasis on tenure-track faculty involvement, and there are corresponding limitations on clinical track faculty chairing a student's thesis committee. Clinical faculty are often responsible for the student's research, particularly at the ARUP Research and Development Institute, and competent to chair the student's research. We recommend that the Department consider amending its rule on graduate committee membership. Another option is to consider switching the requirement of a thesis to a student project.

The Dean and Associate Dean of the Graduate School will work with the Graduate Council to explore the creation of a Graduate Faculty (GF) who would be designated to serve on student committees. The Graduate Faculty designation would be assigned based on a number of criteria (to be determined by the Graduate Council, the Dean, and departments) and this would alleviate the current logistical issues that are created by the current requirement of allowing only tenure-track faculty to serve. The Graduate School will target implementation of the GF designation for the 2014/15 academic year.

b. The Department could help address the issue of limited student stipend funds (currently $6,000) to support MS students, possibly through greater development efforts.

The Program Co-Directors strongly support this recommendation. However, as discussed above, the availability of funds is limited. The Chair is pursuing fundraising with alumni and through other sources via the Development Office.

c. Students expressed specific concerns with the level and unevenness of the 6900 course, Techniques of Biochemical Analysis in Laboratory Medicine, that serves both fellows and master's level students. Students also suggested that the Scientific Writing course should be a requirement for all MS students (currently it is an elective). These concerns should be attended to.

The Program Directors and Chair agree with the reviewers' suggestions and have met with the course director and lecturers to more clearly define the scope of subject material and outcomes measurement. In addition, they have consulted with a student group for direct feedback and suggestions and believe they have addressed their concerns. Follow-up evaluations will be tracked.

The faculty focuses on technical or scientific writing with the MS students during the first-year courses. The Program Directors feel that there is significant emphasis on scientific writing within the Program and prefer not to require a separate formal course. They will recommend the course for our students, but prefer that it remain an elective rather than a core course. They will also get the word out to students that the Department of Writing and Rhetoric offers WRTG 7060 Scientific Writing and WRTG 6000 Writing for Publication.

d. The students could use more communication about the processes for degree completion and when they should take their preliminary examination. A timeline and flowchart outlining the major steps for degree completion should be developed for the students.

Following the visits of the reviewers, the Program Directors constructed a document with the timelines and sequences of Program and Graduate School requirements. It was introduced to the first-year students at the end of Fall semester, in a review of requirements session, and was well received. The document will be used in the yearly update sessions between the Program Directors and students who have been in the Program 1+ years, and it will be included on the MS Program website.

Division of Microbiology and Immunology

4. MI Program Recommendations:

a. Expectations for what is considered by the graduate program for a PhD degree should be clearly articulated by the graduate program and efforts should be made to shorten the time to complete the PhD degree. Currently the time to degree completion is long relative to national standards. A requirement or process for a thesis proposal could help accelerate student progress and research. This requirement could include components such as more feedback from the supervisory committee to the student; creation of a graduate student handbook with clear listings of requirements and the timetable; and/or financial incentives in terms of stipend or tuition payments.

In response to the reviewers' comments the Program has made several changes in its PhD program to try to reduce the time it takes for a student to complete the degree: 1) The timeframe has changed and students will now advance to candidacy early in their second year; 2) After each Thesis Advisory Committee meeting the thesis advisor will prepare a document summarizing the meeting, including student accomplishments and goals for the future. It is hoped that clearer communication of expectations will help students focus on the highest priority tasks at hand; 3) The Program will

increase the frequency of Thesis Advisory Committee meetings for students starting with their fifth year. Students in their fifth and sixth years will be required to have two meetings per year, and students in their seventh year and beyond will have three meetings per year. 3) The Program Director and Division faculty are in discussion regarding the best way to handle the thesis proposal (see Recommendation 4b) so that it helps rather than hinders students' progress.

b. The format of the preliminary exam is to identify a topic completely separate from the thesis area of research and develop an NIH research proposal. Students and faculty found this to be a productive endeavor but that it is too restrictive to identify the exam topic that is completely separate from the area of students' future research. The external reviewers recommended that this arrangement be given further consideration.

The Program faculty have discussed this recommendation and have modified the rules so that the preliminary exam guidelines are less restrictive regarding choice of topic.

c. Several programmatic course suggestions from the review committees include: an early graduate-level depth immunology class as an elective, biostatistics and bioinformatics classes (possibly available through other programs), and opportunities for more student feedback on coursework and on how to improve content/delivery of material covered.

The Program Director agrees that it is a good idea to offer Introductory Immunology as an elective course available to first-year students in the Molecular Biology and Biological Chemistry programs. The plan to offer the course in Spring semester is in progress toward implementation. Student evaluation questions are currently being revised to more accurately reflect student feedback on the effectiveness of course content and delivery.

There are a number of courses currently that have been offered from other departments, including Human Genetics 6090 (Introduction to Bioinformatics), Biomedical Informatics 6030 (Foundations of Bioinformatics), Biomedical Informatics 6105 (Statistics for Biomedical Informatics), and Biology 6500 (Statistical Modeling for Biologists). Students will be informed about these courses.

d. Additional recruiting efforts for graduate students in the Division would be desirable, such as an annual "Open House" with poster sessions and free lunch to highlight the programs of the Division.

The Program faculty believe the annual retreat of the Microbial Pathogenesis Training Grant serves the purpose of recruitment well. It is well attended and considered to be very effective. In future years invitations will be extended to all first-year graduate students in addition to marketing it in broader ways.

e. Students are interested in more interaction with ARUP and clinical aspects of pathology, and are also concerned about job placement after the PhD. A Career Day event or occasional seminar speakers from non-academic venues (clinical labs, regulatory agencies, patent law, etc.) could help provide career guidance. With uncertainties about the economy and job market, current graduate students feel they could use advising on career alternatives in basic sciences, or academics including law, pharmacy, etc.

1) The Pathology Department has begun a new program to encourage collaborations between basic scientists in the Microbiology and Immunology Division and the clinical scientists in other divisions, and will try to include students in these endeavors; 2) ARUP has an annual colloquium where investigations into new clinical testing are presented; an invitation will be extended to all students to attend this colloquium; 3) The Clinical Pathology Division has a monthly Grand Rounds seminar series, and graduate students will be invited to this seminar series in the future.

The Molecular Biology and Biological Chemistry Programs run a Career Day every other year that has speakers on a variety of career options in addition to academics. There is anecdotal evidence that students have found the Career Day to be helpful in their career planning. The Graduate Dean suggested that more career services for graduate students in general be implemented in the Health Sciences and informed all parties present about the career workshops and services offered through the Graduate School's Office for Postdoctoral Affairs.

f. More efforts on development and endowed funds could enhance the program in the following ways: a one-year research rotation for MD students (similar to the Hughes program), and endowed chairs that would serve to recruit and retain world-class faculty.

The Department Chair and Program Directors think these are excellent ideas, both for the medical students and for the Department. They will consider initiating a post-sophomore medical student fellowship in Pathology if adequate new funds become available through endowments or other external sources. A newly established endowed chair in the Department and the "Triple I" interdepartmental collective (Immunology, Infectious Disease, and Inflammation) initiative will both serve to recruit and retain world-class faculty.

This memorandum of understanding is be followed by regular letters of progress from the Chair of the Department of Pathology to the Dean of the Graduate School. Letters will be submitted each year until all of the actions described in the preceding paragraphs have been completed.

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