

**NEW GRADUATE DEGREE
FORM D**

UNIT PREPARES IN QUINTUPLICATE
Route as indicated below under approvals. Return to the Scheduling Office once all signatures have been obtained.

Date: 8/31/2004

Leslie A. Danielson, PhD
(Name of Individual initiating new Graduate Degree)

Director of Med Lab Sciences Program; 272-5509
(Title, position, telephone number)

Pathology; Med Lab Sciences Program
(Department/Division/Program)

UNM

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1. Give exact title in space provided and requirements for the new graduate degree as they should appear in the Graduate Bulletin.

Masters Degree in Clinical Laboratory Sciences

- Prerequisites: Completion of MLS Bachelor Degree or Certificate Program or Committee approved Bachelors degree in Biology/Chemistry/Biochemistry
- Core Curriculum: 19 credit hours plus 6 credit hours of approved electives
- Non-thesis Apprenticeship in research/clinical laboratory: 10 credit hours
- See attached proposal

2. Attach the complete proposal in the approved format.
3. Does this new degree affect any existing program? Yes ___ No X. If yes, attach statement.
4. Library impact statement. Name of individual consulted and attached signed impact statement.
5. CIRT impact statement. Name of individual consulted and attached signed impact statement.
6. Proposed date to admit new students: Semester June Year 2006

Required Signatures:	Department Chair <u>Mary F Lyons</u>	Date: <u>9-28-04</u>
	Dean of Library Services <u>Christina G...</u>	Date: <u>9-27-04</u>
	Assoc. VP for CIRT <u>Sandra...</u>	Date: <u>9-24-04</u>
	College Curricula Committee _____	Date: _____
	College or School Dean <u>Ellen M Cozzone</u>	Date: <u>10/1/04</u>
	FS Graduate Committee _____	Date: <u>2-2-06</u>
	Office of Graduate Studies <u>Amy B Wohlet</u>	Date: <u>2-7-06</u>
	FS Curricula Committee <u>A. Wohlet</u>	Date: <u>4/11/06</u>
	Office of the Provost <u>Amy B. Wohlet</u>	Date: <u>4/13/06</u>
	Faculty Senate <u>Duran Salazar</u>	Date: <u>4/26/06</u>
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	Board of Regents <u>(attested) Amy B. Wohlet</u>	Date: <u>5/10/06</u>
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For Scheduling Office ONLY:

Proposal for the
Master of Science Degree Program
In Clinical Laboratory Science at the
University of New Mexico

Prepared and Submitted by
Leslie A. Danielson, PhD, MT (ASCP)
Director of the MLS Program
September 2004

Master of Science in Clinical Laboratory Sciences Proposal

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EXECUIVE SUMMARY

PROPOSAL Master of Science Degree In Clinical Laboratory Sciences

The Graduate Studies Program in Master of Science Degree in Clinical Laboratory Sciences

Need for Program:

A new master's degree in Clinical Laboratory Sciences is needed for the following three reasons:

1. To address critical shortages of properly prepared scientists to work in the research lab, advanced clinical laboratories and growing biotechnology businesses in New Mexico
2. To address the demand for advanced degreed faculty in Medical Laboratory Sciences programs in New Mexico and the United States
3. To facilitate the advancement of Clinical Laboratory Scientists from the bench work into supervisory positions within research, clinical and biotech laboratories

Approval by the University of New Mexico:

The Master of Science Degree in Clinical Laboratory Sciences, including the non-thesis master's exam, has passed the preliminary approval stages at the University of New Mexico-School of Medicine. We are hoping to receive the support of Senate Graduate Committee, the Faculty Senate, the Provost/VP for Academic Affairs, President Caldera, and the Board of Regents.

A) Academic Purpose and Objectives

The primary academic purpose of our advanced degree is to prepare our graduates to actively participate in the rapidly advancing biotechnology field. This purpose will include education of students to supply a pool of clinical laboratory scientists to rise to the top in supervisory positions in clinical and research management. By educating these students, we will also help to fill the large void for advanced degreed faculty in the undergraduate and graduate educational field of the clinical lab sciences student population.

Academic objectives are to:

1. Increase the student's technical competence in the research and clinical arena.
2. Develop an approach to research procedures for the successful pursuit of a biotechnology degree
3. Provide a working background in scientific writing and data management
4. Increase the student's awareness and knowledge of new laboratory-related technologies.
5. Develop collegial relationships with researchers and practicing clinicians while developing an awareness of essential bioethical questions
6. Prepare the student for continuation into an appropriate PhD program if desired
7. Prepare the student to move into faculty positions in the UNM MLS program and programs around the United States

B) The Curriculum

This newly proposed degree is unique because it is built on a program that is already ensconced at the School of Medicine, the Biomedical Sciences Graduate Program (BSGP). This program is already taught by a number of well-qualified MD/PhD Professors. We are proposing to add two new courses for this

degree, MdLab 500 and MdLab 550, two topics courses, and a professional internship (MdLab 600). This internship will include a final oral presentation of work accomplished and will be overseen by L. Danielson, PhD and J Scariano, PhD faculty of the undergraduate Medical Laboratory Sciences Program (CVs are attached in Appendix E.

All existing coursework is already taught by the established and degreed faculty listed below:

Core Courses

Biomed *448L/511: Biochemical Methods/Intensive Biochemistry:	W. Anderson, PhD
Biomed 507: Advanced Molecular Biology:	Dave Peabody, PhD
Biomed 508: Advanced Cell Biology:	David Bear, PhD
Biomed 555: Problem Based Research Bioethics	Brian Hjelle, PhD
Stat 538: Biostatistical Methods Public Health/Medical	R. Schrader, PhD
MdLab 500: Selected Topics in Laboratory Medicine	L. Danielson, PhD
MdLab 550: Laboratory Management Seminar	M. Luke, PhD
+ 6 Credits of Electives (established coursework)	

Masters Degree Non-thesis Plan

MdLab 600: Non-thesis Apprenticeship in research/specialty clinical lab L. Danielson, PhD
J. Scariano, PhD

This new master's degree program in Medical Lab Sciences will accept academically qualified applicants who have completed the Bachelor Degree in Medical Laboratory Science or Bachelor-degreed students with a certificate in Clinical Laboratory Sciences from an accredited school. Applicants with bachelor's degrees in biology or related science will be considered on a case-by-case basis and may be required to make up deficiencies before entrance to the program.

Description of need for the Program

A) Relationship to Programs Offered at Other NM Universities

There are no duplicated programs in the state. This proposal for an advanced degree is built on the cooperation with the established Biomedical Sciences Graduate Program (BSGP) to provide for the didactic portion of the degree. In our letters of support, the director of this program, Laurie Hudson, PhD, has stated her unqualified support for our new program in terms of dovetailing our master's degreed students into a PhD in the BSGP, if the student desires. We have the support of other NM universities, professional associations and state agencies. Additionally, in our letters of support, you will find a number of UNM research laboratories that are willing to train as well as hire our students once they attain this degree, J. Hozier, PhD, Bridget Wilson, PhD, Thomas Williams, MD, and Kendall Crookstan, MD.

Special Features Making UNM-SOM an Appropriate Place to Initiate this Program

There are three special features of the UNM-SOM that make it ideal to host this program. One is the established BSGP described above. Secondly, the newly established Office of Research and Graduate Programs on North Campus will be our administrative center. And thirdly, the Department of Pathology is a unique hybrid of clinical and basic science, with recognized research done in both fields. Many faculty members are also affiliated with the clinical laboratory sections at Tricore Reference Laboratories. Students will have the opportunity to participate in research throughout the School of Medicine and Health Sciences Center, which includes genetics, pharmacology, infectious diseases, immunology, cell biology, and all areas of specialized clinical laboratory science.

B) Opportunities for Advanced Degrees

This would be an intermediate degree offered for Clinical Lab Scientists. Six institutions offer PhD level programs. All are located in the Midwest (Indiana, Kentucky) or on the east coast (Massachusetts, Mississippi, Virginia and Washington, DC). However, our graduates will have the opportunity to receive doctoral degrees in other disciplines, including chemistry, biology, mathematics, and the BSGP offered here at UNM.

C) Opportunities for Employment

Graduates of this program would be employable by higher education institutions, research and business entities, health care organizations, community clinics, private laboratory clinics, military and VA hospitals, and many other medical care-providing institutions. Master’s degree prepared clinical lab scientists enjoy an increasing need for their services in New Mexico and nationwide according to the National Bureau of Statistics/Occupations. Opportunities for those with a master's degree in clinical laboratory science are expected to be better than PhD trained scientists. Employment is expected to grow by 30-40% through the year 2010, as the volume of laboratory tests increases with population growth, increasing number of elderly in the medical system and the development of new types of biotechnology tests adapted for clinical laboratory use. New, increasingly powerful diagnostic tests will encourage additional testing and spur advanced degreed employment. Significant job growth will not be the only source of employment opportunities. As in most occupations, many openings will result from the need to replace the “baby boomer” workers who transfer to other occupations or retire.

III. Resources Requirements

A) Budget Request: In the first two years, we expect that a training grant awarded to the Pathology Department will be available to support this new program. Our department head, Dr. Mary Lipscomb has promised the full support of the Pathology Department resources until formula funding becomes available.

Expenses	Year 3	Year 4	Year 5	Year 6	Year 7
Faculty salaries/FTE	\$16,250(.25)	\$17,063	\$17,916	\$18,811	\$19,752
Staff salaries/FTE	\$10,000(.25)	\$10,500	\$11,025	\$11,576	\$12,155
Fringe Benefits	\$6013	\$6313	\$6629	\$6960	\$7308
GA/TA/RA salaries	\$0				
Other salaries	\$0				
Supplies	\$27500	\$27500*	\$27500	\$27500	\$27500
Equipment	\$0				
Library	\$0				
TOTAL INCREASE	\$53,750	\$61,376	\$63,070	\$64,847	\$66,715
Income	\$0				
State	\$0				
Reimbursements	\$0				
Savings	\$0				
Endowments, etc.	\$0				
TOTAL INCOME	We expect to be funded by formula funding by summer 2008				

B) Justification

The students will pay current UNM graduate tuition to main campus. At the moment, we are unable to have access to that money to pay for the apprenticeships (\$5000/student*) for our students or for the faculty/staff requests. The apprentice fee is listed under supplies category of the above budget. The

student will bring \$5,000 each year to the apprenticeship lab to defray lab costs for his/her project. We are currently looking into formula funding for our program. Unfortunately the Med Lab Sciences Program has 'restricted' credits for its undergraduate program leading to the situation of restricted credits for the graduate program. Vanessa Hawker and Marjorie Goldstein are currently working with all of the graduate programs on the Health Sciences Campus to 'unrestrict' the credits on its campus. We have filed the necessary paperwork to receive formula funding according to University policy.

The .25 FTE will be for the administration of the program and go to help fund the director's position. We are also requesting 0.25FTE for a staff person to help fund the administration of our program out of the Office of Research and Graduate programs on North Campus.

C) Library

We currently have a statement signed by Christee King from the Health Sciences Library and Informatics Center that states that there would be no significant impact on library resources. CIRT and Health Sciences Computer support team was also contacted and the results were the same for these departments. There are signed impact statements in Appendix H.

Projected Enrollment

	2005-2006	2006-2007	2007-2008	2008-2009
Students				
New	5	5	5	5
Continuing	0	5	5	5
Total	5	10	10	10

Introduction

A brief look at our profession is warranted to understand the need for an advanced degreed student. Clinical laboratory testing plays a crucial role in the detection, diagnosis, and treatment of disease. Clinical laboratory scientists also referred to as medical technologists perform most of these tests (1).

Clinical laboratory personnel examine and analyze body fluids, tissues, and cells. To name just a few of the areas in which the lab personnel are important: they look for bacteria, parasites, and other microorganisms; analyze the chemical content of fluids; match blood for transfusions; and test for drug levels in the blood to show how a patient is responding to treatment. These scientists also prepare specimens for examination, count cells, and classify abnormal cells. They use automated chemistry/immunology equipment and instruments capable of performing a number of tests simultaneously, as well as microscopes, cell counters, and other sophisticated laboratory equipment. Then, they analyze the results for accuracy and release them to physicians. With increasing automation and the use of computer technology, the work of technologists and technicians has become less hands-on and more analytical. The complexity of tests performed, the level of judgment needed, and the amount of responsibility workers assume depend largely on the amount of education they have (1).

Clinical laboratory scientists trained at the University of New Mexico earn a bachelor's degree or certificate in medical laboratory sciences that allows them to sit for a national certification exam to earn the title of Clinical Laboratory Scientist. After national certification and subsequent employment, they are ready to evaluate test results, develop and modify procedures, and establish and monitor programs, to ensure the accuracy of tests. This type of personnel will continue to be trained here at UNM for entry level positions. However, there is a strong need for an advanced degreed clinical laboratory scientist to fill research, managerial and educational positions.

This trend began in the mid 1990's and continues today calling for more educated personnel (2). Many of the new clinical tests are relying on more complex and less automated molecular and cytogenetic techniques. Biotechnology and pharmaceutical firms are in desperate need of scientists that not only know the basics of laboratory testing and quality control but also

are able to collaborate and develop new testing for diseases and drug efficacy (3). This would be the type of position open to our graduates. Additionally, forensic testing, as well as the new emphasis on forensic techniques, is an employment target for our graduates. As our discipline evolves, graduate education in the area of clinical laboratory sciences is gaining an increasing importance in the profession (4, 5). Thus, the Department of Pathology, Program of Medical Laboratory Sciences, University of New Mexico School of Medicine, proposes the following program addition: the Master of Science Degree in Clinical Laboratory Sciences.

It is important to note that the accreditation team from the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) that visited the undergraduate program in October of 2000 found no deficiencies and bestowed the maximum accreditation term of seven years. There are approximately 240 baccalaureate CLS programs in the United States (6).

References

1. Doig K, Beck SJ, and Kolenc K. (2001). CLT and CLS Responsibilities: Current Distinctions and Updates. CLS 14:31, 173-182.
2. Beck S. (1994). Assessing the educational preparation of Clinical Laboratory Scientists. CLS, 7:5, 293-298.
3. ASCLS Position Paper. Laboratory's/Laboratorians' Duty to provide information not just data. CLS 1999:12 (1); 10-11.
4. Li RC, Bigler W, Blackwood L et al. CLS advanced degrees and career enhancement part 1-comparison of career data. CLS 1998; 11(1); 21-27.
5. Li RC, Bigler W, Blackwood L et al. CLS advanced degrees and career enhancement part 2-comparison of career data. CLS 1998; 11(1); 28-34.
6. Accreditation Review Summary: University of New Mexico's Med Lab Sciences Program Self Study Report, Spring 2001.

9.1.1 Purpose of the Program and Mission of the Proposing Institution

The Purpose and Mission of the Proposed Program

The purpose of the Master of Science Degree Program in Clinical Laboratory Sciences is essentially three-fold. First, our graduates will provide New Mexico with a program aimed at developing scientists to step into newly created biotechnology jobs. Secondly, we will provide a graduate that will be able to effectively supervise technicians in clinical and research laboratories. Thirdly, our graduates will teach and develop clinical laboratory science programs throughout the southwest and the nation. We are targeting the underserved southwest and New Mexico. The purpose of this master's degree program is consistent with the mission of the University of New Mexico which is to educate students by developing their intellectual and creative skills and capabilities so students may be well equipped to participate in the world as productive workers. The University of New Mexico, Health Sciences Center and School of Medicine wholeheartedly support this program. (Please see Appendix D for letters of support).

Primary Consistency with Role and Scope at UNM

These goals and the development of clinical laboratory sciences education at the master's level are consistent with the role and scope of both the University of New Mexico and the Strategic Plans of the Department of Pathology and the School of Medicine on the UNM Health Sciences Center (HSC). The mission of UNM includes delivery of educational programs at all levels, generation of scholarship and creative works, and public service that arises from the teaching and research activities and contributes to them.

In concert with the UNM HSC, the Department of Pathology is committed to the HSC vision of identifying and solving the most important research questions pertaining to human health in our communities through education, scholarship and service with commitment to the HSC core values. HSC core values include integrity, accountability and decisiveness in commitment to excellence; compassion and respect in our interaction with students, patients and colleagues; diversity in people and thinking, effective utilization of our resources, and advancement of our institution mission while supporting professional and personal growth. A master's program in clinical laboratory sciences is able to support all of these core values. The UNM HSC mission is to provide added value to health care through leadership in: providing innovative, collaborative, education, advancing frontiers of science through research critical to the

future of health care, delivering health care services that are at the forefront of science, and facilitating partnership with public and private biomedical and health enterprises. These purposes are shared and integrated by our program for clinical laboratory scientists prepared at the master's level. They will have the capabilities and essential knowledge to pursue this mission. The strategic plan of UNM includes the objective: "to evaluate and restructure the University of New Mexico's support for graduate education and raise the effectiveness and stature of our programs". This important objective is evident in the proposed addition of this program within the Department of Pathology under the auspices of the Biomedical Sciences Program/Office of Graduate Research and Education.

9.1.2 Justification for Implementation of the Program

Biotechnology processes date back thousands of years: humans learned to breed animals and produce foods such as wine and cheese long before they had any understanding of genetics or fermentation. Today, biotechnology is broadly defined as the science of using molecular biology techniques for a number of different applications. Perhaps the best known areas of modern biotechnology are its use in medical research, forensics, and development of pharmaceuticals and medical therapies¹. Scientists working in medical research and development study the human body and the intricate way in which it functions in order to develop new life-saving therapies, drugs and medical tests to predict diseases. We in the United States are an aging population that demands more sensitive and specific ways to detect life threatening diseases as well as new medical therapies and drugs to halt these diseases, all at a lower cost². Our advanced degree students can work in these laboratories with a minimum of on-the-job training. They will come to the job with skills that will allow them to participate in this science.

The National Committee for Clinical Laboratory Scientists (NCCLS) annually holds national conferences focusing on clinical laboratory research and theory development.³ One major recommendation proposed during the past conference (2005) was the need for master's degreed CLS scholars to focus on test development and research work⁴. Ideally, the most appropriate settings to develop and validate laboratory methods are graduate programs offering advanced degrees in clinical laboratory sciences.

Nationally, the majority of faculty members in CLS academia hold a master's or PhD degree in laboratory sciences or a related field⁵. The effect of the terminal degree in CLS on the

quality and credibility of our educational system is also apparent since, universally, an earned Master's Degree in the discipline is considered the minimal preparation for a qualified faculty member⁵.

Most importantly, as the number of graduates from a Master of Science Degree Program in CLS increases, a redefinition of the CLS profession will begin. The increase in CLS educational preparation will directly affect lab personnel and practice. In fact, research in molecular, clinical and research supports the need for the establishment of graduate level programs⁶. The future professional growth of laboratory personnel is dependent on the development of quality graduate education, as well as the design of research that increases knowledge as it relates to the advancement of the discipline⁷. Clinical laboratory science academia bears the responsibility for not only educating future laboratory professionals, but for advancing the practice of clinical laboratory science. Ultimately, a Master of Science Degree in Clinical Laboratory Science from the University of New Mexico/ School of Medicine would graduate lab personnel capable of advancing our profession.

At present, CLS educators nationwide have stated that students on the undergraduate level are prepared only for careers in the clinical hospital or private doctor's office settings.¹ New Mexico does not provide any advanced degree in Clinical Laboratory Science. Moreover, only 34 master degree-level and 6 PhD educational programs exist that prepare certified CLS for continuing or alternative careers⁸. Of the above mentioned master's programs, 25 are located east of the Mississippi River, 6 are in the Midwest and only 3 are in the West. None are located in the southwest. All of the PhD programs are located on the East Coast. Because of the lack of graduate programs, many lab personnel choose to leave the profession to pursue graduate education provided by other disciplines. Due to the emphasis on quality control and assurance that the CLS receive in their undergraduate degree, this is an important loss to the pharmaceutical, clinical assay development, and forensic fields that can not be filled readily.

The Department of Pathology, Med Lab Sciences Program is able to offer this advanced degree due to the promotion of two of the faculty members from Lecturer positions to tenure track positions. These faculty positions will allow the Medical Lab Sciences Program to oversee a graduate program which we were unable to do previously. Another important factor in proposing this graduate degree is two-fold. First, there is a strong established Biomedical Graduate Program that is currently offering the core curriculum for our prospective master degree students. Dr.

Laurie Hudson has voiced her support for our program and is willing to design an articulation agreement with our students allowing them to smoothly enter the PhD Biomedical Graduate Program after successfully attaining our Masters degree, if they desire. Secondly, many University and clinical laboratories are willing to not only train but hire our students. These laboratories would provide an internship but employment after the student graduates. If an educational internship is desired, it will be provided by the Medical Laboratory Sciences Undergraduate Program.

In summary, the Master of Science Degree in Clinical Laboratory Sciences would benefit the citizens and businesses of New Mexico, now and in the future, through increased quality of personnel for biotechnology firms, research and development labs and future educators.

References:

1. Department of Labor Statistics: Biotechnology Careers
2. Bureau of statistics about aging populations: www.bls.gov
3. Body of Knowledge Content-Content Outline. Am. Soc. For Clin. Lab Science. Bethesda, MD. Clinical Laboratory Scientist Content Outline by the NCA, 2001
4. 20th Annual Clinical Laboratory Educator's Conference: CLEC 2004. Milwaukee, Wisconsin.
5. Needs Assessment Survey, Clinical Lab Educator's Conference: CLEC 2004
6. Waller K, Wyatt D and Karni K. (1999). Scholarly Activities Among Clinical Laboratory Science Faculty. CLS 12:1, 1-9.
7. Beck SJ and Doig K. (2002). CLS competencies expected at entry –level and beyond. CLS 15:4, 220-228.
8. Directory of Graduate Programs for Clinical Lab Practitioners 4th edition. American Society for Clinical Lab Science, 2001.

9.1.2.1 Need for Program

A new master's degree in Medical Laboratory Sciences is needed for the following three reasons:

1. To address critical shortages of scientists to work in the research lab, advanced clinical laboratories and growing biotechnology businesses in New Mexico
2. To address the demand for advanced degreed faculty in Medical Laboratory Sciences educational programs in New Mexico and the United States
3. To promote the advancement of the Clinical Laboratory Scientist into supervisory positions within research, clinical and biotech laboratories

Need 1: To address critical shortages of prepared scientists to work in research facilities, advanced clinical laboratories, and growing biotechnology businesses in New Mexico

In our first specified need, our program will provide New Mexico and the southwest with graduate scientists able to step into newly created biotechnology jobs. To justify the implementation of a master's degree level CLS, we assessed the needs of the Pathology Research faculty at the University of New Mexico. The vehicle survey for this assessment of graduate skills is found in Appendix B and resulted in compiling a list of molecular skills that will be required by each individual mentoring laboratory. These skills will be tailored by each laboratory electing to work with a student during his/her two year apprenticeship. This research survey also addressed necessary management skills preferred by the participating labs. In addition to the required skills list, the research labs emphasized a number of management skills ranging from ordering lab necessities to compilation of data and writing proposals for the continued funding and research of the mentoring lab.

Need 2: To address the demand for advanced degreed faculty in Medical Laboratory Sciences programs in New Mexico and the United States

We addressed our second need by utilizing a survey at the most recent Clinical Laboratory Educators Conference in Milwaukee, Wisconsin in March 2004. The survey and its summarized results are found in Appendix B. From this vehicle of assessment, it is clear that our graduates would find employment in education due to the ever-growing need for experienced and advanced degreed faculty around the nation. Of the 40 programs assessed, 50% of them were expecting 1-3 opening in the next 3 years. Further, the candidate preferred by these established programs would have a master's degree in Clinical Laboratory Science. It is also interesting to note, only 6% of the current directors have an advanced degree in CLS. However, greater than 85% of program directors have either a masters or PhD degree in a non-CLS field. Another telling fact is that half of the programs do not hire BS degreed faculty. The only option for an experienced clinical/research CLS if they desire a faculty position, is to return to school for an advanced degree.

Need 3: To promote the advancement of the Medical Technologist into supervisory positions within research, clinical and biotech laboratories.

Our third need addresses the importance of clinical laboratory personnel to be managed by a supervisor who is specifically trained in our profession. Supervisors in the clinical lab setting come from internal promotion or from a national search. If an internal promotion occurs, they are expected to master a very steep learning curve going from bench to management. Very often, the laboratory suffers from a lack of well-prepared supervision until the promoted technologist progresses to the point of being able to lead effectively and efficiently. If the supervisor comes from a national search, more often than not the hired supervisor has an advanced degree in business management, not in clinical laboratory management. Our advanced degreed student graduating from our program will already be a trained bench CLS but have the experience of a management internship with an established laboratory. To investigate the needs of the existing clinical labs, we initiated a survey, finished and tallied in March of 2004. Our findings, assessed from 24 labs (65% rate of returned surveys), dictated our present course of action. The clinical laboratories were definitely not in favor of a master degree for the entry level CLS. However, 55% of the current laboratory supervisors would hire our graduates for the following positions: expertise in molecular diagnostics, cell/tissue culture, research experience, or lab administration capabilities. See Appendix B for the tally numbers.

9.1.2.2 Duplication of the Program

New Mexico Programs

New Mexico currently has no Master of Science Degree Programs in Clinical Laboratory Science. In fact, in the vast western region of the United States, only 3 Masters Degree Programs currently exist: Texas, Utah and Washington. Moreover, New Mexico currently has the only university based clinical lab sciences undergraduate program in three western states: Arizona, Colorado and New Mexico.

The UNM Medical Laboratory Sciences Program has an entry level Bachelor of Science Degree in the MLS Program and a Bachelor of Science Degree Certificate Program. The entry level program is a four year program: two years are spent on main campus where the student takes undergraduate prerequisites; the next 1½ years is spent on North Campus attending the MLS clinical courses; and the last semester gives the student time for clinical laboratory rotations in Albuquerque and around the state of New Mexico. Twenty students are admitted every year and clinical experiences are gained within the hospital laboratories in Albuquerque and rural clinical

sites throughout the state. Although it is not a distance education program, all students complete some of their clinical and health promotional activities at over 20 sites throughout the state. The majority of our students complete some of their requirements in rural areas of New Mexico. Moreover approximately, 30% of the entry-level graduates from the past eight years are now practicing in underserved areas of New Mexico. ***Over 90% of our students continue to reside and practice in New Mexico.*** Our current proposal would not affect the undergraduate program.

Currently, there are three Medical Laboratory Technician Programs in New Mexico, Albuquerque Technical and Vocation Institute, UNM-Gallop and UNM-Alamogordo. These three programs train a total of 15-17 technicians/year. These are employed at local clinical laboratories.

The Master of Science Degree Program in Clinical Laboratory Sciences will help all of the educational programs in New Mexico by providing faculty, who are in short supply, to teach and train undergraduate students at TV-I or UNM branch campuses. Further, the graduate students will help at clinical rotation sites to technically prepare undergraduate students for hospital/clinical/research careers. These existing undergraduate programs will serve as internship sites for the Master's Degree Candidates who wish to specialize in an educational internship in order to address the critical shortage of qualified faculty.

WICHE Programs

The Western Interstate Commission for Higher Education includes up to fifteen western states which offer a wide variety of undergraduate, graduate and professional level programs to out-of-state residents at in-state tuition rates. However, there are no Master of Science Degree Programs in Clinical Laboratory Sciences/Medical Technology offered in the WICHE programs in the Western United States. Therefore, there are limited opportunities for students in New Mexico to enroll in an out-of-state university with in-state tuition rates. We fully intend to apply to the WICHE program if this master's degree program is accepted.

9.1.2.3 Inter-Institutional Collaboration and Cooperation

The UNM Program of Medical Laboratory Science currently works with a wide variety of educators, lab professionals and health care providers across the state of New Mexico providing our students with numerous and diverse learning opportunities in their clinical rotation sites. Our

program currently participates in the Rural Health Interdisciplinary Health Grant (RHIP), along with all of the other health professions at the Health Sciences Campus. We will be utilizing on site and off site clinical rotations to further enhance the quality of education the Master’s Degree Candidates receive. It is through these existing relationships and newly-created relationships that our program is able to offer such a prestigious educational opportunity to students in New Mexico. We currently place our undergraduate students in over 10 clinical sites around the state. Please see table 1 for examples of sites we serve.

Table 1
University of New Mexico
MLS program
Affiliated Sites

The UNM Medical Laboratory Science students work in numerous settings in New Mexico as part of their professional training. Our students provide educational and clinical services to these organizations within New Mexico. They actually work in over 10 cities within New Mexico including:

- S.E.D. Medical Laboratories
- TriCore Reference Laboratories
- Veterans Administration Medical Center
- Acoma, Canoncito, Laguna Hospital-San Fidel
- Cibola General Hospital-Grants
- Clovis Plains Regional Medical Center-Clovis
- Eastern New Mexico Medical Center-Roswell
- Espanola Hospital-Espanola
- Gila Regional Medical Center-Silver City
- Holy Cross Hospital-Taos
- Mountain View Regional Medical Center-Las Cruces
- Northern Navajo Medical Center-Shiprock
- Rehoboth McKinley Christian Health Care Services-Gallup
- St. Vincent Hospital-Santa Fe
- San Juan Regional Medical Center-Farmington

9.1.3 Clientele and Projected Enrollment

9.1.3.1: Projected Clientele

The UNM MLS undergraduate program currently conducts an outcomes assessment of recent graduates yearly. Approximately 40% of the last two year's respondents have expressed an interest in attending a Master of Science in Clinical Laboratory Sciences Program if offered at the UNM MLS program located on North Campus. Moreover, 8 practicing clinical laboratory scientists in the Albuquerque clinical laboratories have contacted us upon learning that the Program was proposing this addition. These practicing professionals continue to call to check on the status because they are interested in applying to this program.

Data from our entry level program is depicted in Table 3 and Table 4 regarding information on ethnicity and gender diversity of our clinical laboratory science students for the past five years. These statistics are considerably better than the national average in the discipline of clinical laboratory scientists and we are very proud of our diversity. Our master's degree students will continue to show this great diversity due to the tremendous variety of candidates.

Recruitment efforts will continue to attract applicants from an ethnically-diverse background. Specific efforts will be made throughout New Mexico through schools, clinics, hospitals, community agencies and professional associations. Targeted efforts will also be made nationally through the NCCLS, American Society for Clinical Laboratory Scientists and the NCA. At UNM we will aspire to match or exceed our undergraduate program statistics to insure that they reflect the state's diversity.

Table 3

Ethnic Clusters in the Entry Level Program for the Past Five Years

Year of Graduation	White	Black	Hispanic	American Indian	Asian	Unknown	Male	Female	Total # of Students
2004	6	1	7	4			4	14	18
2003	6		4	2			2	10	12
2002	2	1	2	2	1		1	7	8
2001	6		1				1	6	7
2000	5		3	2	4		4	10	14
Totals	25	2	17	10	5		12	47	59

Table 4
Gender Clusters in the Entry Level Program

Students	Male	Female
2000-2004	12 (20%)	47 (80%)

9.1.3.2: Projected Enrollment

In response to the identified needs from our tools of assessment, the UNM MLS Program is proposing a Master of Science Degree in Clinical Laboratory Sciences. The Master of Science in CLS will prepare clinical and research scientists with specialized skills in clinical laboratory medicine, undergraduate education, management, or research. Enrollment in the Master’s Degree Program will be on a competitive basis, with a maximum class size of up to 5 per academic year. Because the program is two years in length the program would have a class size of up to 10 graduate students completing their first and second year course work. Students may enroll part time or full time and the forecasted number of credits per year would be 350 graduate student credit hours.

Table 1
Projected Enrollment

	2005-2006	2006-2007	2007-2008	2008-2009
Students				
New	5	5	5	5
Continuing	0	5	5	5
Total	5	10	10	10

Table 2
Credit Hour Generation

Enrollment Year	2005-2006	2006-2007	2007-2008	2008-2009
Total Headcount	5	10	10	10
Credit Hours	21	35	35	35
# Student Hours Generated	21x5=105	35x10=350	35x10=350	35x10=350

9.1.4 Institutional Readiness for the Program

The faculty needed to teach in this proposed program are already in place with the qualifications needed to initiate the program. The UNM Medical Laboratory Science Program has two tenure-track professors, L. Danielson, PhD and J. Scariano, PhD, who will develop and oversee the new internship and topics courses. The majority of the core requirement classes for the first two years of the program will be taught by the faculty of the Biomedical Graduate Sciences Program, the Department of Pathology faculty or clinical site faculty. We have a CLT faculty in place to assist in laboratory preparation and grading (of our undergraduate students) that will free the UNM MLS faculty members to take additional responsibility in clinical teaching endeavors and in the administration of the proposed master's degree program.

Appendix E contains the curriculum vitas of our two advanced faculty. Our faculty are very diverse and have expertise in a wide variety of laboratory science subjects as well as research knowledge and experience. The faculty are extremely capable of starting this program. In fact, the UNM MLS Program received no deficiencies or recommendations in the last mandatory education certification by NCCLS. This places our program among the top 10% in the country. There are approximately 240 MLS programs in the United States.

It is important to note that the proposed faculty workload for the Master's program in no instance takes resources from the baccalaureate program. The Division will continue to enroll 10-12 students in the entry level program and 10-12 students in the degree certificate program/year.

The Health Sciences Center Library will work with the UNM MLS faculty to assume responsibility for ensuring an adequate library collection. The equipment and technological resources have been updated within the past five years and so they are more than adequate for the program. In addition, our own physical facilities are adequate and the graduate students will have one large office to share. This will be a great support for the students to insure that they have a private study area within the facility. Further, the graduate student office will be equipped with computers having access to the internet. Additional clerical personnel will not be needed.

The MLS Program will be combining marketing and recruiting strategies with our current program. Outcome assessments have indicated that there is great support among our graduates and alumni who are interested in attending a Master of Science Degree Program for Clinical Laboratory Scientists. This program would be advertised to all certified New Mexican medical lab personnel. The UNM Master of Science/Clinical Laboratory Science will enable students to:

- build on the knowledge gained in baccalaureate degree medical laboratory science.
- prepare and specialize in one of three areas: research, lab management or education.
- enhance decision-making skills by participating in graduate level biomedical courses.
- develop problem-solving skills for collaborative research and clinical lab personnel.
- contribute to the CLS body of knowledge.
- conduct research and theory development in the laboratory science.
- expand the scope of general knowledge by participating in University elective courses.
- provide career opportunities in alternative practice settings.
- build a foundation for future doctoral education in related disciplines.
- develop collegiate relationships with practicing healthcare professionals.
- participate in opportunities for graduate laboratory experiences in educational settings, industry and community outreach sites.

9.1.5 Projected Cost of the Program

The reason the Medical Lab Sciences Program is able to offer this proposed area of study is due to close cooperation of the educational foundation of the Health Sciences Campus which includes the presence of an established Biomedical Sciences Graduate Program. Further, the Department of Pathology has a relationship with the largest and only clinical reference lab in the state, TriCore Reference Laboratories, located in close proximity to the University of New Mexico School of Medicine campus. Finally, the Department of Pathology and the Health Sciences Center have well-funded research programs that can support master's degree student projects. Training grants with the Department of Pathology and the Cardiovascular Group will assist with the monies to support our students for their final required projects if formula funding is not available.

The MLS Program currently has four full time faculty members who teach an average of 9 credit hours per semester. Adding the graduate curriculum to the program would not impact the teaching of the current faculty members. Additionally, adjunct faculty would be added to cover the summer course, MedLab 500, to allow the program director administrative time. Moreover, the Medical Laboratory Sciences Program has 10 adjunct faculty members available to mentor the students during their clinical laboratory time.

9.1.5.1: New Costs for Program Start-up

Start up costs for this program will be minimal due to the fact that the faculty is already in place to teach and mentor the students. And the Biomedical Sciences Graduate program is well established. Formula funding will be utilized when available to run the program. Please see Appendix A for a more detailed explanation.

9.1.5.2: State Support

We are currently trying to add formula funding to our program which would eliminate the need for state support.

9.1.5.3: Other Support

The University of New Mexico/Pathology Department has been awarded a training grant for fellows in the department. Dr. Mary Lipscomb has indicated that we would be able to use some of the money to support the projects for our students during the first two years of the program.

9.1.6 Quality of Program

The following curriculum is designed to meet high standards of academic quality, considering its instructional curriculum, faculty, admission standards, academic support and provisions for continual review and improvement of the program.

Core Requirements

Biomed 448L*/511	Biochemical Methods/Intensive Intro Biochemistry	3 Credits
Biomed 507	Advanced Molecular Biology	4 Credits
Biomed 508	Advanced Cell Biology	4 Credits
Biomed 555	Problem Based Research Bioethics	1 Credit
Stat 538	Biostatistical Methods Public Health/Medical	3 Credits
MdLab 500	Selected Topics in Laboratory Medicine	2 Credits
MdLab 550	Laboratory Management Seminar (available at selected times during the two year program)	2 Credits

Electives

6 Credits

Masters Degree Non-thesis Plan

MdLab 600: Non-thesis Apprenticeship in research/specialty clinical lab Cytology, Genetics & Cytometry, Biochemistry, Cell Biology, Immunology etc.	10 Credits
Total:	35 Credits

Typical Full-Time Student Year:

Year One:

Fall:	*Biomed 507/508: Adv Molecular Bio 1 and 2	8 Credits
	*Biomed 555: Problem Based Research Bioethics	1 Credit
	*MdLab 600: Selection of laboratory	1 Credit
Spring:	*Biomed 448L*: Biochemical Methods *or*	3 Credits
	*Biomed 511: Introductory Biochemistry	3 Credits
	*MdLab 600: Selection of laboratory, begin apprenticeship: Fulfill Required Skill List for particular lab	3 Credits
	*MdLab 550: Clinical Lab Management Topics Course	1 Credit
Summer:	*MdLab 600: Apprenticeship	2 Credits
	*MdLab 500: PBL/Lab management course	2 Credits
	*MdLab 550: Clinical Lab Management Topics Course	1 Credit

Year Two:

	*Stat 538: Biostatistical Methods 1	3 Credits
	*MdLab 600 : Apprenticeship continues	4 Credits
	**Electives: hours taken from list below	6 Credits
Summer:	Presentation of Final Project (Mater's Exam)	

*Core courses **Electives:

****Elective Courses:**

Techniques:

- Biomed 524 (1): Electron Microscopy
- Biomed 522 (3): Experimental design and methods in Molecular/Cellular Biology
- 546 (4): Advanced Techniques in Light Microscopy
- Chem 566 (3) Spectroscopy

Neurosciences:

- Biomed 509 (3): Principles of Neurobiology
- Biomed 532 (3): Neurochemistry
- Biomed 533 (4): Neurophysiology and Neuroanatomy
- Biomed 535 (1): Neuroscience Seminar

Cell Biology/Physiology

- Biomed 510 (3): Physiology
- Biomed 515 (3): Cancer Biology
- Biomed 516 (3): Molecular Genetics and Genomics
- Biomed 576 (3): Molecular and Cellular Pharmacology

Biomed 580 (3): General Toxicology
Biomed 644 (3): Mechanisms of Gene Expression
Biology 544 (4) Genomes and Genomic Analyses
Biology 510 (3) Genome and Computational Biology
Immunology/Infectious Disease:
Biomed 514 (3): Immunobiology
Biomed 652 (2): Immunopathogenesis

***Core Course Descriptions**

Biomed 448L*: Biomedical Methods (3 credits): Biochemical techniques including chromatographic and electrophoretic purification of enzymes, determination of enzyme parameter, fractionation of subcellular organelles, isolation of chromatin, biosynthesis of protein, analysis of DNA

Biomed 511: Intensive Introductory Biochemistry I (4 credits): An introduction into physical and chemical properties of proteins and enzymes, enzymatic catalysis, structure, synthesis and processing of nucleic acids and proteins; structure and control of genetic material

Biomed 507: Advanced Molecular Biology (3 credits): The course covers the structures and functions of nucleic acids and proteins, mechanisms and macromolecular synthesis and principles of enzymology

Biomed 508: Advanced Cell Biology (4 credits): Course covers advanced topics in cell biology, including microscopy, the nucleus, protein and membrane trafficking, cytoskeleton signal transduction, cell cycle and division and extracellular matrix.

Biomed 555: Problem based Research Bioethics (1 credits): This is a problem-based discussion course on topics in bioethics such as publication credits and authorships; conflict of interest and fraud, scientific misconduct, human genomics and other relevant issues

Stats 538: Biostatistical Methods 1 for Public Health and Medical Sciences (3 credits): Covers basic statistical methods, including statistical summaries and inference. Methods of summarizing data include graphical displays and numerical summaries. Statistical inference includes hypothesis testing and confidence intervals. Methods for continuous and categorical data are studied

MdLab 500: Pathology Course (2 credits): A new course, problem based learning, how to manage a research laboratory. Proposal writing, personnel problems, HIPPA concerns

MdLab 550: Clinical Lab Topics Course (2 credits): A course based on seminars in clinical laboratory management topics by adjunct and visiting faculty which will include cost and personnel management.

MdLab 600: Clinical Rotations (9 credits): Clinical and research rotations in laboratories, including viral, molecular, research.

9.1.7. Assessment of Operations and Impact

Formal Evaluation of the Program

All UNM graduate programs undergo program review on a seven-year cycle. The reviews and standards are set by the Provost's Office and Faculty Senate committees of the University of New Mexico and will be followed to the letter by this proposed program.

Unfortunately, there are no nationalized accreditation standards available from the accrediting agency for Master of Science in Clinical Laboratory Science. However, the Med Lab Sciences Program will continue external reviews on a bi-annual basis. There are other master's degree programs willing to externally review the program through National Certification Agency for Medical Lab Sciences.

Faculty of the Program

The Medical Lab Sciences Program currently has four full-time faculty members. Two of the faculty members are on the tenure track and have their PhDs in Biomedical Sciences from the University of New Mexico and two have their Bachelor of Science Degree from the University of New Mexico Med Lab Sciences Program. Moreover, the faculty are actively involved in teaching and either clinical practice or research. The tenure track faculty members devote one semester/year to active research in their respective fields, which helps to defray the cost of the faculty salary while ensuring that the faculty members remain active in their field. The two faculty with certification and BS degrees work one semester/year in the laboratories around the Albuquerque area to maintain their clinical skills. Please see attached curriculum vitas of faculty, Danielson and Scariano, who will be responsible for the graduate program. In addition, the Med Lab Sciences Program has 10 adjunct faculty affiliated with the Department of Pathology who contribute their time to guest speak in the undergraduate Program students.

Medical Laboratory Sciences Program Assessment

This program will be evaluated by the same methods utilized by our undergraduate programs. In particular, focus areas for assessment will include recruitment efforts, curricular program, externship sites, administration, budget and staff, mandatory graduate projects, and job placement.

In order to evaluate recruitment efforts, the number of applicants and the ethnic and gender composition of all applicants and students will be mapped. This information will help us develop strategies at recruiting in areas of need. Recruitment efforts will continue to be combined when appropriate with both the allied health graduate programs at the UNM HSC and the other graduate programs at UNM.

The curricular program will be evaluated by graduating students, employers of students, 5 and 10-year alumni, undergraduate students and patients. These individuals will complete outcome assessment surveys. Graduate students will also be added to this endeavor which is a continual process within our Program. In addition, assessment procedures such as student focus group assessments, ongoing curricular review by faculty, and graduate project outcomes will aid in program operations and impact. Results of these surveys will be utilized to revise curriculum. Currently, the full time faculty meet at least every other week. Any graduate education issues will be addressed at these meetings. Should a situation present itself that needs immediate attention, a faculty meeting will be scheduled as soon as possible. This is the current procedure for our undergraduate program as well.

Apprenticeship sites will be evaluated by faculty and graduate students for their facility, safety policies and procedures, daily operation, communication skills of staff and faculty supervision and teaching. The apprenticeship site form will be completed and discussed at monthly graduate student meetings and faculty meetings. The graduate/undergraduate program director will hold monthly graduate student meetings to help aid effective communication in our program.

Administrative and budget issues will be addressed monthly between the Director, the graduate program director and the academic administrator. These meetings are already in place for our undergraduate program and will continue with the additional of the graduate program. Additionally, staff will be evaluated by the graduate students during outcomes assessment surveys

and graduate student focus groups. This is already in place for our undergraduate program and will continue for our graduate program.

Graduate project outcomes will be discussed at our annual faculty retreat in July of each year. This retreat has been held for the past three years and graduate educational issues will be added to the agenda for discussion. Job placement of our graduates will be tracked by outcomes assessment surveys and continued communication with our graduates. This tracking is already in place in our undergraduate programs and graduate students will simply be added to our student list.

Assessment surveys for program satisfaction can be viewed in Appendix I. Admission and student promotion regulations can be found in Appendix H.

9.1.8 Administrative Responsibility for the Program and Institutional Commitment

A full-time faculty member of the Med Lab Sciences Program will coordinate the graduate program. The faculty member will be the Graduate Program Director and assume all administrative educational and advising responsibilities of the graduate program and respond directly to the Medical Director of Med Lab Sciences Program and the Office of Graduate Studies. Twenty-five percent of the graduate program director's FTE will be allocated to the graduate program.

The Graduate Program Director, Dr. Leslie Danielson, has experience with the Biomedical Graduate Program at the University School of Medicine. She is a 1995 graduate with a PhD in Biomedical Sciences. In 1995, Dr. Danielson began working as a Lecturer II for Barbara Fricke, the Director of the Medical Laboratory Sciences Program. After Ms. Fricke retired in 2001, Dr. Danielson became the director of the program and was promoted to the tenure track, assistant professor. Dr. Danielson has been a funded researcher for the past 12 years working with a consortium that included Magee Women's Research Institute in Pittsburgh, Pennsylvania. She has authored many publications in the field of the mechanisms of renal vasodilation during pregnancy. She has begun attending annual graduate/undergraduate education meetings for the Clinical Laboratory Sciences. At the 2004 CLEC: Clinical Laboratory Educators' Conference in Milwaukee, she participated in many of the seminars on the subject of graduate Clinical Laboratory Programs.

The academic administration of our graduate program will be aided by the newly reorganized Office of Biomedical Research and Education. This office is the home of the

Biomedical Graduate Program and the office for the administration of fellows and residents in the Pathology Department. Mary Jane McReynolds is the current head of this administrative office that is housed in the Basic Medical Sciences Building, Health Sciences Center. Ms McReynolds has promised to consider the administration of our program when they are fully staffed. Until that time, our administrative assistant, Susan Dellinger, will be the academic administrator of our Master's Degree Students.

The head of the Department of Pathology, CLS Medical Program Director, Graduate Program Director and Academic Administrator will meet monthly to discuss administrative and budget issues with the graduate program. The Graduate Program Director will bring all graduate educational issues to the faculty during the bimonthly faculty meetings. In addition, the Graduate Committee comprised of at least two full-time faculty members, one graduate student and chaired by the Graduate Program Director will make recommendations for policy changes and revisions to the entire faculty and ultimately, head of the Pathology Department, Dr. Mary Lipscomb.

Summary

The addition of the Master of Science in Clinical Laboratory Science will benefit the University of New Mexico, Department of Pathology, potential graduate students, the clinical laboratory science profession and ultimately the state of New Mexico. The Department of Pathology and the Medical Lab Sciences Program would benefit by both national recognition of the undergraduate program and the addition of graduate education to the program. Graduation from the University of New Mexico would occur when graduate work is published and/or presented regionally or nationally. Moreover, faculty would find a mentoring role with graduate students motivating.

The laboratory science profession and its practitioners would benefit by increasing the knowledge base of the laboratory sciences. The increase of Master of Science in CLS programs would result in a more capable and educated cadre of lab professionals, ultimately benefiting the up and coming biotechnology, advanced research and clinical labs in the state of New Mexico.

Appendix A: Budget

Budget Request

We fully expect to have no start up costs for the first two years due to the training grant awarded to the Pathology Department in 2005

Expenses	Year 3	Year 4	Year 5	Year 6	Year 7
Faculty salaries/FTE	\$16250(.25)	\$17063	\$17916	\$18811	\$19752
Staff salaries/FTE	\$10000(.25)	\$10500	\$11025	\$11576	\$12155
Fringe Benefits	\$6013	\$6313	\$6629	\$6960	\$7308
GA/TA/RA salaries	\$0				
Other salaries	\$0				
Supplies	\$2500	\$27500*	\$27500	\$27500	\$27500
Equipment	\$0				
Library	\$0				
TOTAL INCREASE	\$34763	\$61376	\$63070	\$64847	\$66715
Income	\$0				
State	\$0				
Reimbursements	\$0				
Savings	\$0				
Endowments, etc.	\$0				
TOTAL INCOME	Hopefully formula funding will be available for our students in Summer, 2006				

D) Justification

The students will pay current UNM graduate tuition to main campus. At the moment, we are unable to have access to that money to pay for the apprenticeships (\$5000/student*) for our students or for the faculty/staff requests. The apprentice fee accounts for the large increase in supplies that is seen between the first and second year for our students. We are currently looking into formula funding for our program. Unfortunately the Med Lab Sciences Program has restricted credits for its undergraduate program leading to the situation of restricted credits for the graduate program. Vanessa Hawker and Marjorie Goldstein are currently working with all of the graduate programs on the Health Sciences Campus to 'unrestrict' the credits on its campus. We have filed the necessary paperwork to receive formula funding according to University policy.

The .25 FTE will be for the administration of the program and go to help fund the director's position. We are also requesting 0.25FTE for a staff person to help fund the administration of our program out of the Office of Research and Graduate programs on North Campus.

Appendix B:

I. Needs Assessment Survey from Researchers: 2003

1. In a short paragraph, describe what your lab group studies.
2. The top 4 skills that I would like to see in an research technician applicant to be of use in our lab: Please be as specific as possible
 - a. _____
 - b. _____
 - c. _____
 - d. _____
3. How important is theory versus hands-on skills in your lab?
4. Is technical writing an important skill for your technicians to learn?
5. Would you be able to take a student, if the funds were available, and mentor them through the final year project?
6. How competent must your technician be on the computer?

Compiled Results: Top Skills wanted:

1. Enzyme purification/kinetics/spectroscopy
2. Protein chemistry: purification etc
3. Protein and RNA biochemistry
4. DNA manipulations
Cloning, Expression, Transfection, Recombinant DNA methods, PCR and Sequencing
5. Gene expression: Northern, Westerns, and ELISA
6. Chromatography: HPLC and FPLC
7. Protein Immunoassays
8. Flow Cytometry
9. Cell culture Techniques (mammalian cell culture)
10. Viral cultivation
11. Microscopy: Fluorescence and EM
12. Computer analysis of genes/genomes
13. Quantitative Analysis (Calculations)
14. Sterile Technique
15. Animal Handling (Rat and Mouse)
16. Solution prep/pipetting skills

Management/Office Skills

1. Statistics
2. Epidemiology
3. Record/Notebook keeping
4. Management skills
 - a. Order supplies
 - b. Safety
 - c. Chemical Inventory
 - d. Other bureaucratic skills
5. Capability to solve problems independently
6. Good Attitude/team worker

Theory versus Hands-on	Technical Writing essential?	Computer Skills Importance?
Hands-on	No	As needed
Theory	Nice but not expected	Moderately competent
Equal	Notebook essential Paper not expected	Important
Hands-on more important to get results	Yes	Important
Hands-on	Not that important	Very Important
Equal	Absolutely	Important
Hands-on but knowledgeable and interested	Nice but probably unattainable	Important
Hands-on	No	Very competent
5 hands-on 2 Equal 1 Theory	6 no (but would be nice) 2 yes	2 moderate competent 4 competent 2 very competent

II. Needs Assessment in the Education Field

1. Specify the highest degree of each of your faculty							
	AA	BS-MLS	BS-Other	MS-Non-CLS	MS-CLS	PhD-Non-CLS	PhD-CLS
#1 Director		1	3	25	2	15	
#2	1	7	6	15	1	10	
#3		5	7	6		4	
#4		5	3	6		2	
#5		5	2	1		2	
#6-8		1				3	
2. How many faculty positions are at your institution?							
1-2	3-4		5-6		7-8		>8
15	15		5		2		40
3. How many faculty are expected to retire in the next 3 years?							
1-2	3-4		5-6		7-8		>8
20	1						
4. Scenario: Two applicants for a teaching position at your institution, one has a master's degree in CLS and the other a master's in Biology, which would receive a higher score on your application matrix screening?							
CLS	Biology		Both get same score			Other preferred degree: specify type	
35	1		4				
5. If you hire BS personnel, in what capacity do they serve the program?							
Faculty	Lab assistants		Prep work		Other: specify		
20	13		4		Will Not hire: 3		
6. Please estimate your student/faculty ratio?							
<5:1	5:1-10:1		10:1-15:1			>15:1	
8	18		9			5	

Survey Completed at Educator's Conference: February 2004
Surveys distributed: 50; Surveys returned: 40

APPENDIX C

**EXAMPLE OF REQUIRED SKILLS CHECKLIST
MOLECULAR PATHOLOGY**

Student Task List

Technical tasks and minimal competency are evaluated according to the following criteria:

BMC: *performs Below Minimal Competency:* The student performs the task with inconsistent technical skills. The student needs direct supervision with constant and detailed instruction in order to perform the assay or procedure.

PAS: *Performs at or Above minimal lab:* The student performs the task with *competency Standards* average or above average technical skill, requires minimal supervision, and understands the basic principles of the assay or procedure.

NA: *Not Applicable:* This procedure or method is not performed in this lab.

TASK	B M C	P A S	NA	COMMENTS	Clinical Instructor Initials
MANUAL METHODS					
Reagent Preparation (daily)					
Specimen Accessioning (daily)					
Tissue Preparation (daily)					
DNA Isolation (5)					
Manual?					
Spin Column					
DNA Quantification (5)					
Yield					
Purity					
Restriction Enzyme Digestion (4)					
Calculating Digest Mix Components					
Appropriate use of Enzymes					
Efficacy of Digestion					

TASK	B M C	P A S	NA	COMMENTS	Clinical Instructor Initials
MANUAL METHODS					
Gel Preparation (6)					
Agarose					
Polyacrylamide					
Other (SSCP)					
Southern Blot (5)					
Capillary					
Vacuum					
Electroblot**					
Hybridization (5)					
Probe Preparation					
Wash Stringency Calculation					
Efficacy of Hybridization					
AUTOMATED METHODS					
Amplification (8)					
Polymerase Chain Reaction					
RT-PCR					
TMA**					
HCA**					
BDNA**					
DNA Sequencing (4)					
Microarray Assay (4)					
Viral Load Assay (4)					

** If assays are not available at affiliate site, increasing the number of tasks in other area to compensate will be needed.

Appendix D: Letters of Support



THE UNIVERSITY OF NEW MEXICO • HEALTH SCIENCES CENTER
SCHOOL OF MEDICINE

DEPARTMENT OF PATHOLOGY

August 31, 2004

University of New Mexico School of Medicine
Curriculum Committee

RE: Letter of support for the masters program in Medical Laboratory Sciences

Dear Colleagues:

I would like to offer a strong letter of support for the establishment of a masters level program in Medical Laboratory Sciences at the University of New Mexico. I would also be willing to involve graduate students from this program in the laboratories that I direct.

I have worked closely with medical technologists since I was an undergraduate in college. At that institution, the program was housed in the department of Microbiology, where I received my degree. Since that time I have learned from, worked with, and taught hundreds of medical technologists on a daily basis. I was a guest lecturer in the program at the University of Washington and I also lecture from time to time in the program at UNM.

In a time when many laboratory activities can be done by pushing a button on an instrument, many people have been deceived into thinking that the discipline has somehow become less sophisticated. On the contrary, troubleshooting and quality assurance activities require greater knowledge than they have in the past. In addition, research laboratories have become more sophisticated and a technologist that can successfully balance all of the various demands can save considerable time for the researchers and money for the granting institution. Therefore there is a great need for competent technologists that can fill these higher-level positions.

Of course, through on-the-job experience in a laboratory, a bachelors level technologist can eventually learn many of the skills proposed for the master level program. However, this takes longer and comes through trial and error.

Another reason that I am particularly in favor of this program follows: Historically, medical technology students have been among the brightest at their institutions. Many could also do well in medicine, pharmacy, or physical therapy. As financial compensation will probably never be as great in medical technology as in these other areas, we should at least give those who sincerely desire to excel in medical technology the opportunity for advanced training, rather than have them consider alternative careers.

In summary, I feel that the proposed program, while perhaps not the largest at our institution, will fill a needed void locally and nationally.

Sincerely,

Kendall Crookston, MD, PhD, FCAP
UNM Department of Pathology

Fulbright Visiting Professor, University of Copenhagen Health Sciences Center (2004-2005)



THE UNIVERSITY OF NEW MEXICO
HEALTH SCIENCES CENTER
Division of Cell Pathology

September 13, 2004

Leslie Danielson
Director, Medical Lab Science Program
Health Sciences & Services Bldg, Rm 217
& Dept of Pathology

Lee,

This letter serves to document my enthusiastic support for your plans to implement a master's degree in laboratory medical science. We have communicated several times during the developmental phase, since I am a former member of the Graduate Steering Committee and a current block leader in Med Sci 508. I have also served as a mentor for several recent graduates in the Ph.D. program and served on committees for master's degree candidates in both Neuroscience and Math departments.

I think there is a real need for this kind of focused training and believe strongly that your graduates will be well received in the job market. There are ample positions available for highly skilled laboratory technicians, whose advanced degree have prepared them for managerial tasks as well as developed scientific acumen. I have found this to be true for my own largish basic science laboratory, where two of our senior technicians hold master's degrees. These senior technicians are the "backbone" of the laboratory, capable of designing and troubleshooting complex experiments and of training the incoming students. I know that clinical laboratories also have a serious need for master's level technical expertise to lead development and implementation of new clinical assays. Too, I have polled colleagues in the biotech industry and they tell me that most of their available jobs are at the master's level, not the Ph.D. level.

I look forward to working with you further and – hopefully – to hosting a trainee in my laboratory at some point.

Sincerely,

Bridget S. Wilson
Associate Professor



THE UNIVERSITY OF NEW MEXICO • HEALTH SCIENCES CENTER
SCHOOL OF MEDICINE

DEPARTMENT OF PATHOLOGY

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Lida A. Crooks, M.D.
Kendall P. Crookston, M.D., Ph.D.
Leslie A. Danielson, Ph.D.
Bruce S. Edwards, Ph.D.
J. Cole Elliott, M.D.
Edgar G. Fischer, M.D., Ph.D.
Bonnie Griffin, B.S.
Alexis A. Harris, M.D.
Richard C. Harvey, Ph.D.
Michael R. Holbrook, Ph.D.
John C. Hozier, Ph.D.
Glynnis B. Ingall, Ph.D., M.D.
Rebecca A. Irvine, M.D.
Nancy E. Joste, M.D.
Charles R. Key, M.D., Ph.D.
Walter Kisiel, Ph.D.
Mario Kornfeld, M.D.
Richard S. Larson, M.D., Ph.D.
Sarah Lathrop, DVM, Ph.D.
Matthew M. Luke, M.D.
Larry W. Massie, M.D.
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Patricia J. McFeeley, M.D.
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Wilbur L. Williams, M.D.
Cheryl L. Willman, M.D.
Bridget S. Wilson, Ph.D.
Carla S. Wilson, M.D., Ph.D.
Myra C. Zucker, P.A.
Ross E. Zumwalt, M.D.

September 11, 2004

Lee Danielson MT(ASCP), PhD
Med Lab Sciences Program Director
Department of Pathology

Dear Lee:

I would like to offer my support for your plans to develop a master's program in your curriculum. I direct the HLA and Molecular Diagnostics Laboratory and the Genetics and Cytometry Division at TriCore Reference Laboratories. I also conduct clinical research at UNM. In both our clinical and our research laboratories, we would greatly benefit from a program such as the one you are developing. We will be happy to provide training opportunities for your students as necessary. As you know, our laboratories are staffed with a substantial number of certified medical technologists, research personnel with bachelors and masters degrees, and managers at a variety of levels who will be able to be excellent resources for your students.

I am looking forward to working with you to make this program a reality.

Sincerely,

Thomas M. Williams, MD
Professor, Department of Pathology
UNM School of Medicine
MSC08 4640
1 University of New Mexico
Albuquerque, NM 87131-0001
(505) 272-8059 fax (505) 272-8084

Director, Genetics and Cytometry
TriCore Reference Laboratories

CC: rcsilva



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Vice-Chair for Research

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Carla S. Wilson, M.D., Ph.D.
Myra C. Zucker, P.A.
Ross E. Zumwalt, M.D.

Dr. Lee Danielson
Program Director of Medical Laboratory Sciences Program
Department of Pathology
Health Sciences Center

Re: Support of the MLS Master Degree Proposal.

Dear Lee,

This is a letter to strongly support your proposed program for a Master's Degree in Medical Laboratory Sciences (MLS). As we have discussed, I am very clear that there is a need in the State of New Mexico for an advanced MLS degree. Students with BS degrees in MLS should have an opportunity to advance in their specialty training in the sciences and cutting edge technology to meet a growing need New Mexico.

Specialty laboratory leadership in hospital and regional reference laboratories requires advanced training beyond the BS degree. The Masters degree program that you describe will provide this opportunity. Specifically, the student will learn advanced technologies, the scientific method, and administrative skills needed to become part of the leadership of a science based laboratory. Not only will these skills be needed in clinical laboratories, but also in nonclinical scientific laboratories in New Mexico's academic institution. Finally, these masters level graduates are needed for the technology based businesses that are increasing in our state.

Your program is long overdue, and I am very pleased that you and your medical laboratory sciences faculty have taken the initiative to develop such a program. As the Chair of the Department of Pathology, the department in which your program is bared, I strongly support the continued development and implementation of the Masters degree program.

As the Medical Director of the MLS BS Program, I know your current program to be excellent. Since you became director, we have met on a regular basis to discuss the challenges and successes of the

BS program. We have continued to discuss plans for the development of the Masters level program. I will continue to meet on a regular basis with you and your faculty to provide oversight for the new program. You and Dr. John Scorigano were recently placed on the tenure track within our department and, as such, I will continue to monitor your professional success both in the MLS program and in your research. Your role as a teacher, program director and scientist will provide a model for students entering the Masters program.

Please let me know as you continue to develop this program what I can do to help. Best of luck!

Sincerely yours,



Mary F. Lipscomb, MD



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Myra C. Zucker, P.A.

Ross E. Zumwalt, M.D.

Leslie A. Danielson, Ph.D.

Assistant Professor

Health Sciences Center

Department of Pathology

1 University of New Mexico

Albuquerque, NM 87131

Dear Lee,

After taking part in several meetings on the subject of your proposed Master of Science degree program in Medical Laboratory Services, and having received and discussed your proposed curriculum, I would like you to know that I support your proposal with great enthusiasm.

Since I have both research and clinical laboratories to run, I'm acutely aware of the shortage of upper-level scientific technical personal capable of supervising the use of the new complex biotechnologies.

If your program proposal is successful, I would like very much to participate by having students in the program work in my laboratory on an "apprenticeship" basis. I think this is an educational approach that benefits the student as well as the participating laboratory.

Please let us know if there is anything else I can do to support this important and timely academic program.

Sincerely,

John C. Hozier Ph.D.

Professor



THE UNIVERSITY OF NEW MEXICO • HEALTH SCIENCES CENTER

SCHOOL OF MEDICINE

Office of Research

October 8, 2004

Lee Danielson, MT (ASCP), Ph.D.
Med Lab Sciences Program Director
Department of Pathology
School of Medicine
University of New Mexico

Dear Dr. Danielson,

I am writing in support of the proposed Medical Laboratory Sciences Master's degree program. This Master's degree program will serve the needs of the biological sciences research community in New Mexico by providing training targeted at producing research professionals properly prepared for research, clinical, biotechnology, state and national laboratories.

The proposed curriculum is appropriate to the program objectives and is distinct in scope and purpose from the Master's program in Biomedical Sciences. This course of studies will give students the proper background for a professional career as laboratory managers and scientists. The requirements for Problem Based Research Bioethics, Biostatistical Methods and Selected Topics in Laboratory Medicine distinguish this program and will provide thorough grounding in practical aspects of research management.

An important aspect of the proposed program is opportunity for students to select electives that will allow a seamless transition into the Biomedical Sciences Ph.D. program. Master's students (Biomedical Sciences or Medical Laboratory Sciences) interested in entering the Ph.D. program, must complete the Biomedical Sciences Core Curriculum in good academic standing with no grade less than B- in a required course, pass the Biomedical Sciences qualifying examination, petition the BSGP Steering Committee for entry into the program at advanced status, and apply for a Change of Degree through the UNM Office of Graduate Studies. The proposed Medical Laboratory Sciences Master's degree program will give students the flexibility to make the transition to a Ph.D. if they so desire.

I believe the Medical Laboratory Sciences Master's degree, if approved, will fulfill an important gap in our existing laboratory training programs and address real needs of the New Mexico scientific community.

Sincerely,

Laurie G. Hudson, Ph.D.
Professor and Director
Biomedical Sciences Graduate Program



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DEPARTMENT OF PATHOLOGY

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Marcia L. Wills, M.D.

Bridget S. Wilson, Ph.D.

Carla S. Wilson, M.D., Ph.D.

Myra C. Zucker, P.A.

Ross E. Zumwalt, M.D.

August 25, 2004

Re: Master's Degree Proposal for the Med Lab Sciences Program

Having reviewed the curriculum for the Medical Laboratory Science Masters Program we fully support of the program.

We feel that the impact on departmental informatics would be minimal.

The only time informatics would possibly be involved would be during the Selected Topics in Laboratory Medicine course. We may need to give some instruction or assistance with data gathering and data management in the research lab. Since we are currently set up to give the type of support it will not adversely affect the resources of the department.

We are assuming that the training for clinical laboratory systems would be provided by the staff of the laboratory that the student is apprenticing at and therefore would not have an impact on the department IS staff.

Matthew Luke M.D.

Asst. Professor

Dept of Pathology, Informatics

Althea Moss

Analyst Programmer II

Department of Pathology



SCHOOL OF MEDICINE

Office of Research

Richard Larson, M.D., Ph.D., Senior Associate Dean
 MSPH, MBA, Director
 Deborah L. Helitzer, Sc.D., Assistant Dean for Research
 Operations Manager
 Angela Wandinger-Ness, Ph.D., Asst. Dean for Graduate Studies

Gary Cseko,
 Catherine Penick, PHR,

RESOURCES & FACILITIES Animal Resource Facility Clinical Trials Center General Clinical Research Center Clinical Imaging Resource Center	BIOMEDICAL RESEARCH EDUCATION PROGRAM BSGP & MD/PhD Programs	COMPLIANCE Human Research Protections Animal Care & Compliance Biosafety Human Tissue Oversight Committee Conflict of Interest
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April 3, 2006

Lee Danielson Ph.D.
 Med Lab Sciences Program Director
 Department of Pathology
 School of Medicine
 University of New Mexico

Dear Dr. Danielson:

I am writing in support of the proposed Medical Laboratory Sciences Master's degree program. This Master's degree program will serve the needs of the clinical and biological sciences research communities in New Mexico by providing training targeted at producing research professionals properly prepared for research, clinical or biotechnology careers in the private sector as well as state and national laboratories.

Because of the predicted >50% vacancy rate (ASCP wage and vacancy rate 2003)* in bench and managerial lab professionals in the next 8 years, the graduates of this program will easily find employment. Since most of the qualified candidates for this program will come from New Mexico, many will remain in the state. In the last 10 years, greater than 90% of the undergraduates in the Medical Laboratory Sciences Program have taken first jobs here.

Traditionally, clinical lab managers are promoted from bench personnel. But this type of manager has a very steep learning curve. The curricular requirements for Problem Based Research Bioethics, Biostatistical Methods, Selected Topics in Laboratory Management and Laboratory Medicine distinguish this program from any other master's degree program at the University of New Mexico and will provide thorough grounding in practical aspects of research and clinical management.

I believe the Medical Laboratory Sciences Master's degree, if approved, will fulfill an important gap in our existing laboratory training programs and address real needs of the New Mexico scientific and clinical community.

Sincerely,

A handwritten signature in cursive script, appearing to read "Richard Larson". The signature is written in black ink on a white background.

Richard Larson, MD, PhD
Sr. Associate Dean of Research
UNM School of Medicine
Tricore Reference Laboratory, Board Member

*The Bureau estimates that, from 2002 through 2010, a total of 13,200 new Medical Technologists (MT) and Medical Laboratory Technicians (MLT) will be needed each year to meet the demand for laboratory services as the U. S. population ages. However, the average number of graduates from accredited programs is less than 5,000 per year, indicating an annual shortage of 8,200 qualified personnel.



THE UNIVERSITY OF NEW MEXICO • HEALTH SCIENCES CENTER

SCHOOL OF MEDICINE

Biomedical Research Education Program

Biomedical Sciences Graduate Program

MD/PhD Program

Postdoctoral Affairs

March 24, 2006

Lee Danielson, MT(ASCP), Ph.D.
Med Lab Sciences Program Director
Department of Pathology
School of Medicine
University of New Mexico

Dear Dr. Danielson:

As the new head of the Biomedical Sciences Graduate Program, I would like to express the continued and enthusiastic support for the proposed Medical Laboratory Sciences Master's degree program. I anticipate the Master's degree program will fill an important educational gap by providing training that prepares students for technologically advanced careers in research, clinical, biotechnology, state and national laboratories.

I understand that you expect to admit approximately 5 or less students/year and that a critical aspect of the training will include a mandatory two year apprenticeships in research or clinical laboratories and the completion of select courses in Problem Based Research Bioethics, Biostatistical Methods and Topics in Laboratory Medicine. The program is distinct from the MS offered by the Biomedical Sciences Graduate Program in that the objective is to produce trainees with a grounding in the practical aspects of research management and students will complete a project based degree rather than a thesis based degree. The graduates of the proposed Medical Laboratory Sciences Master's degree program will yield a new cadre of highly trained research technologists and laboratory managers that are in high demand and currently hard to find in New Mexico.

I do not anticipate any problems in the planned enrollment of the entering medical laboratory sciences trainees in some of the Biomed courses offered by the Biomedical Sciences Graduate Program. In fact, it is a strength of the proposed program that there will be cross-talk between trainees in our respective programs. Those trainees who wish to continue their studies by pursuing a Ph.D., may opt to complete the Biomedical Sciences Core Curriculum with no grade less than B- in a required course, pass the Biomedical Sciences qualifying examination, petition the BSGP Steering Committee for entry into the program at advanced status, and apply for a Change of Degree through the UNM Office of Graduate Studies.

I believe the Medical Laboratory Sciences Master's degree, if approved, will fulfill an important gap in our existing laboratory training programs and address real needs of the New Mexico scientific community.

Sincerely,

Angela Wandinger-Ness, Ph.D.
Assistant Dean for Graduate Studies

March 28, 2006

Lee Danielson PhD
Med Lab Sciences Program Director
Department of Pathology

Dear Lee:

I would like to offer my support for your plans to develop a master's degree program in your curriculum. I manage a number of Blood Banks in Albuquerque and around the state of New Mexico and Colorado for TriCore Reference Laboratories. In the last few years, I have experienced first hand the shortage of qualified entry level and supervisory personnel in my field. In my opinion, this problem will only increase due to the shortage of accredited programs in the United States. As with many of my colleagues who have been promoted to supervisory positions, we feel that there is a critical need for additional new programs that would introduce the bench personnel to the world of management in both the clinical and research side of our profession.

After reviewing your proposed curriculum, I feel you have addressed the primary areas that are needed to successfully transition a bench technologist to the supervisory roles in the clinical and the research arena. I am looking forward to being a mentor to an interested graduate student in my fast paced world of Immunohematology.

This is an important mission for the University of New Mexico to fulfill. Good luck with the process of making this degree a reality.

Sincerely,



Cheryl Richards MT(ASCP)SBB
Blood Bank Manager
TriCore Reference Laboratories
Albuquerque, NM



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Carla S. Wilson, M.D., Ph.D.
Myra C. Zucker, P.A.

Ross E. Zumwalt, M.D.

Leslie A. Danielson, Ph.D.
Assistant Professor
Health Sciences Center
Department of Pathology
1 University of New Mexico
Albuquerque, NM 87131

Dear Lee,

After taking part in several meetings on the subject of your proposed Master of Science degree program in Medical Laboratory Services, and having received and discussed your proposed curriculum, I would like you to know that I support your proposal with great enthusiasm.

Since I have both research and clinical laboratories to run, I'm acutely aware of the shortage of upper-level scientific technical personal capable of supervising the use of the new complex biotechnologies.

If your program proposal is successful, I would like very much to participate by having students in the program work in my laboratory on an "apprenticeship" basis. I think this is an educational approach that benefits the student as well as the participating laboratory.

Please let us know if there is anything else I can do to support this important and timely academic program.

Sincerely,

John C. Hozier, Ph.D.
Professor



THE UNIVERSITY OF NEW MEXICO • HEALTH SCIENCES CENTER
SCHOOL OF MEDICINE

Office of the Associate Dean for Graduate Medical Education

April 4, 2006

UNM Faculty Senate Curriculum Committee

Re: PROPOSAL: Masters of Science Degree in Clinical Laboratory Sciences

Dear Colleagues,

As Acting Senior Associate Dean for Education I am writing in support of Dr. Danielson's request for approval of a new master's degree program in Clinical Laboratory Sciences.

As Dr. Danielson eloquently presents in her application, there are three primary justifications for this request:

1. To address the current critical shortages of properly trained scientists for research, clinical and biotechnology labs at UNM and in New Mexico
2. To address the demand for advanced degree faculty in Medical Laboratory Sciences programs, both in New Mexico and nationally, and
3. To promote the advancement of Medical Technologists in supervisory positions

Underlying all three justifications is the need to retain the best and brightest students in medical technology here in New Mexico by providing the advanced training demanded by the market place, and to create opportunities for career advancement for graduates of this program (both in New Mexico and elsewhere in the U.S.) that are not presently available to graduates of baccalaureate programs.

I fully support this application, and hope that it receives your most favorable consideration.

Sincerely,

John C. Russell, M.D.
Acting Senior Associate Dean for Education
Associate Dean for Graduate Medical Education
Professor of Surgery



November 29, 2005

Lee Danielson, PhD
Medical Lab Sciences Program
MSC 09 5250
1 University of New Mexico
Albuquerque, NM 87131-0001

Subject: Cooperative Topic Here

Dear Dr. Danielson,

I was pleased and excited to hear of your proposed new Master of Science Degree in Clinical Laboratory Sciences. I agree that the biotechnology field is rapidly advancing and that the demands on researchers and scientists to conduct and manage this research, is becoming more complex. The bioscience field has experienced significant change over the past ten years. Over the past couple of years, our biotechnology and biomedical research in New Mexico has produced multiple new companies focused on commercialization and product development. I believe this industry will continue to grow. With these new businesses, comes a demand for trained and knowledgeable personnel. These businesses are primarily small businesses and thus the need for researchers capable of conducting management tasks is critical. Small businesses must hire individuals with depth and who are capable of performing multiple tasks. This program has the potential to fill an industry need and to help graduates rapidly adapt to the industry requirements.

I look forward to hearing of the progress in your new program and feel free to call me for information or support that we may provide.

Sincerely,

Elinor I. Reiners
New Mexico Biotechnical and Biomedical (NMBBA) President



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DEPARTMENT OF PATHOLOGY

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Vice Chair for Clinical Affairs

Brian L. Hjelle, MD
Vice Chair for Research

Alexis A. Harris, MD
Vice Chair for Undergraduate
Medical Education

Michelle Barry, MD
William C. Black, MD
Therese J. Bocklage, MD
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Larry A. Sklar, PhD
Mohammad Vasef, MD
Angela Wandinger-Ness, PhD
Wilbur L. Williams, MD
Cheryl L. Willman, MD
Bridget S. Wilson, PhD

Carla S. Wilson, M.D., PhD
Stephen A. Young, PhD
Weihua Zeng, PhD
Myra C. Zucker, PA
Ross E. Zumwalt, MD

March 23, 2006

Lee Danielson, PhD
Program Director
Medical Laboratory Sciences Program
Department of Pathology
Health Sciences Center

Re: Support of the MLS Master Degree Proposal

Dear Lee,

This is a letter to strongly support your proposed program for a Masters Degree in Medical Laboratory Sciences (MLS). As we have discussed, I am very clear that there is a need in the state of New Mexico for an advanced MLS degree. Students with BS degrees in MLS should have an opportunity to advance in their specialty training in the sciences and cutting edge technology to meet a growing need in New Mexico.

Specialty laboratory leadership in hospital and regional reference laboratories requires advanced training beyond the BS degree. The Masters degree program that you describe will provide this opportunity. Specifically, the student will learn advanced technologies, the scientific method, and administrative skills needed to become part of the leadership of a science-based clinical laboratory. Not only will these skills be needed in clinical laboratories, but also in non-clinical scientific laboratories in New Mexico's academic institutions, research institutes, and national laboratories. Finally, these Masters level graduates are needed for the technology-based businesses that are increasing in our state.

Your program is long overdue, and I am very pleased that you and your Medical Laboratory Sciences faculty have taken the initiative to develop such a program. As the Chair of the Department of Pathology, the Department in which your program is based, I strongly support the continued development and implementation of the Masters degree program.

As the Medical Director of the MLS BS Program, I know your current program to be excellent. Since you became Director, we have met on a regular basis to discuss the challenges and successes of the BS program. We have continued to discuss plans for the development of the Masters level program. I will continue to meet on a regular



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SCHOOL OF MEDICINE

basis with you and your faculty to provide oversight for the new program. Dr. John Scariano and you were recently placed on the tenure track within our Department and, as such, I will continue to monitor your professional success both in the MLS program and in your research. Your role as a teacher, program director and scientist will provide a model for students entering the Masters program.

Please let me know, as you continue to develop this program, what I can do to help. Best of luck!

Sincerely yours,

Mary F. Lipscomb, MD
Frederick H. Harvey Professor and Chair

Appendix E: Vitae of Program Faculty

CURRICULUM VITAE: LESLIE A. DANIELSON 6/1/2005

PERSONAL DATA:

Date of Birth: August 16, 1950

Place of Birth: Berwyn, Illinois

Mailing Address: 1409 Soplo Rd. SE
Albuquerque, New Mexico 87123

Telephone: (505) 294 -9995
(505) 277 -5434

FAX: (505) 277 -8079

E-mail address: ldaniels.unm.edu

Spouse and Children: Charles R. Danielson, husband
Geoffrey C. Danielson, son, 24 years old
Meaghan M. Danielson, daughter, 21 years old

EDUCATION AND TRAINING:

1972: Bachelor of Arts Degree
Biology/Chemistry Education
University of Colorado Boulder, Colorado

1977: Bachelor of Science Degree
Medical Technology
University of Colorado Medical Center
Denver, Colorado

1995: Doctor of Philosophy
Biomedical Sciences, Dept of Biochemistry and
Physiology
University of New Mexico
Albuquerque, New Mexico

ACADEMIC APPOINTMENTS:

1972-74: Biology and Chemistry Instructor
Maryborough High School
Maryborough, Victoria
Australia

1982-85: Lecturer, Hematology and Chemistry
Medical Laboratory Sciences
Pikes Peak Institute of Medical Technology
Colorado Springs, Colorado

1994-2000: Lecturer BSEP program
Renal Physiology: University of New Mexico
1994-2001: Lecturer II Clinical Chemistry Instructor
Medical Laboratory Sciences
Department of Pathology, UNM
July 2001-present: Director of Med Lab Sciences Program
Lecturer III, Clinical Chemistry and Urinalysis Instructor
Department of Pathology, UNM

HONORS:

1996: Who's Who Among Teachers in American Universities and Colleges
2002: "Teacher of the Year" Award for the Diagnostic and Therapeutic Sciences

OTHER PROFESSIONAL APPOINTMENTS, POSITIONS:

1991-95 Graduate Research Assistant
Department of Physiology
University of New Mexico
1990-91 Medical Technologist, Generalist
Reference Laboratory
Albuquerque, New Mexico
1985-89 Medical Technologist, Chemistry Supervisor
Boulder Memorial Hospital
Boulder, Colorado
1978-82 Medical Technologist, Lab Supervisor
Lower Valley Hospital
Fruita, Colorado
1977-78 Medical Technologist, Tuberculosis specialist
National Jewish Hospital
Denver, Colorado

LICENSURE AND CERTIFICATION:

American Society of Clinical Pathologists MT 113932
American Society for Clinical Laboratory Science #204027
Colorado Teaching Certificate: 395-54-4448
Arizona Temporary Teaching Certificate: Secondary and Vocational Certificate 395-54-4448

TEACHING AND EDUCATIONAL ACTIVITIES:

UNM MLS program:
MLS 300L Orientation for Students-Spring/Summer
MLS 310 Clinical Chemistry for Medical Technologists
MLS 311L Clinical Chemistry Lab for Medical Technologists
MLS 410L Advanced Clinical Chemistry for Medical Technologists

MLS 351 Basic Clinical Chemistry Rotation
MLS 452 Advanced Clinical Chemistry Rotation
MLS 350L Clinical Urinalysis
MLS 355 Clinical Urinalysis and Phlebotomy Rotation

Medical Student Courses:

Renal Physiology/Acid Base Balance Phase I
Rural Health Interdisciplinary Program: Tutor

Graduate Students:

Nurse Practitioners: Phlebotomy and Clinical Chemistry Test Evaluation
Physician's Assistants: Clinical Chemistry Test Evaluation
Nurse Midwives: Clinical Chemistry Test Evaluation

UNIVERSITY OF NEW MEXICO COMMITTEES:

Rural Health Interdisciplinary Program: Steering/Evaluation Committee
Medical Technology Admissions Committee
Medical Technology Advisory Committee
Recruitment Committee for UNM Medical Technology Program
Student Conduct Committee for UNM
Undergraduate Curriculum Committee for UNM

PROFESSIONAL AND SCIENTIFIC ORGANIZATIONS:

1977-present: ASCP Associate Member
1995-present: New Mexico Society for Clinical Laboratory Science
1996-present: American Association for Clinical Chemists
1999-present: American Physiologic Society

INVITED PRESENTATIONS:

1995-2000: Renal Physiology and Acid Base balance to Basic Sciences Enrichment Program.
10 lectures

1999-present: Renal/Endocrine block; 5 lectures

1999: SGI poster: **Relaxin is a potent renal vasodilator in conscious rats**
FASEB presentation: **Relaxin is a potent renal vasodilator in conscious rats**

2000: **FASEB presentation:** Impact of gender and endothelin on renal vasodilation and hyperfiltration induced by relaxin in conscious rats

2001: **SGI poster:** Relaxin the elusive vasodilator of pregnancy in conscious rats

2003: SGI poster: **Vascular matrix metalloproteinases(s) mediates renal vasodilation and hyperfiltration in relaxin-treated rats**

2004: CLEC Poster: **Development of a Novel and Inexpensive Student-Centered Laboratory Information System for MLS Students**

WORK HISTORY:

July 2001 thru present: *UNM Department of Pathology-Medical Laboratory Sciences*, Program Director. I am responsible for continuation of teaching responsibilities in Chemistry/Urinalysis plus administrative duties for the MLS Program.

Sept 1994 thru present: *UNM Department of Pathology-Medical Laboratory Sciences*, Clinical chemistry and urinalysis Instructor at University of New Mexico. I am responsible for chemistry/urinalysis education of prospective medical technologists plus supervision of clinical rotations in local hospital laboratories.

Aug. 1991 thru Dec. 1995: *University of New Mexico*, Albuquerque, New Mexico: graduate research assistant. PhD: Biomedical Sciences candidate working in the Physiology Department with Dr. Kirk Conrad.

Feb. 1990 thru July 1991: *REFERENCE LABORATORY* Albuquerque, New Mexico: P/T Technologist. Responsible for all routine lab work at Health South Rehab Center.

Dec. 1985 thru July 1988: *BOULDER MEMORIAL HOSPITAL* Boulder, Colorado: P/T and On-Call Technologist. Responsible for all working areas of a small laboratory. Many shifts worked alone. Competent on following machines: Technicon RA 1000, Corning Blood Gas Analyzer, Coulter S Plus, Dupont ACA, and MLA.

Dec. 1982 thru June 1985: *PIKES PEAK INSTITUTE OF MEDICAL TECHNOLOGY*, Colorado Springs, Colorado: Medical Instructor. Responsible for teaching anatomy, physiology, terminology and basic back office procedures to the medical assistants; also taught hematology, urinalysis, basic biology and chemistry to the medical technicians.

Aug. 1978 thru Oct. 1982: *LOWER VALLEY HOSPITAL*, Fruita, Colorado: Chief Medical Technologist. Responsible for clinical lab tests, x- rays and EKG for a 20 bed emergency hospital attached to a 200 bed nursing home; heavy contact with family practice physicians; extensive technical consultation. Hired, trained and supervised technologists.

May 1978 thru Aug. 1978: *NATIONAL JEWISH HOSPITAL*, Denver, Colorado: TB technologist: worked with some of the top experts in the field including Dr. Ruth Waggoner. Conducted identification and sensitivity testing for *M. tuberculosis* and other atypical mycobacterium.

May 1977 thru May 1978: *LOGAN COUNTY HOSPITAL*, Sterling, Colorado: Chief Microbiologist. Set up lab; purchased major equipment for the lab; prepared all media; set up QC test procedures. Wrote the procedure manual to pass the state inspection that year.

PUBLICATIONS:

Dan O. Debrah, Kirk P. Conrad, Lee A. Danielson, and Sanjeev G. Shroff: Effects of relaxin on systemic arterial hemodynamics and mechanical properties in conscious rats: sex dependency and dose response. *J Appl Physiol*, Mar 2005; 98: 1013 - 1020.

Kerchner LJ, Novak J, Hanley-Yanez K, Doty KD, Danielson LA, Conrad KP: Evidence against the hypothesis that endothelial endothelin B receptor expression is regulated by relaxin and pregnancy. *Endocrinology*. 2005 Jun;146(6):2791-7. Epub 2005 Mar 10.

E.S. Hayes, E.C. Curnow, A.O. Trounson, L.A. Danielson and E.N. Unemori. Implantation and Pregnancy Following In Vitro Fertilization and the Effect of Recombinant Human Relaxin Administration in *Macaca fascicularis* DOI: 10.1095/biolreprod. 104.030585 Nov 2004; 71:1591-97

Conrad KP, Debrah DO, Novak J, Danielson LA and S Shroff: Effects of Relaxin on Systemic Arterial Hemodynamics and Mechanical Properties in Conscious Rats: Gender Dependency and Dose Response. First published June 20, 2003: 10.1152/jappphysiol. 010883 *Journal of Applied Physiology* October 2004

Conrad KP, Debrah DO, Novak J, Danielson LA, and Shroff S: Relaxin Modifies Systemic Arterial Resistance and Compliance in Conscious, Non-pregnant Rats DOI: 10.1210/en.2003-1612. *Endocrinology* 145(7): 3289-3296, July 2004

Danielson LA, Jeyabalan A, Novak J, Kerchner LJ and KP Conrad: Essential Role for Vascular Gelatinase activity in Relaxin-Induced Renal Vasodilation, Hyperfiltration, and Reduced Myogenic Reactivity of Small Arteries. *Circ Res* 93:1249-1257, December 2003

Danielson, LA and Conrad KP: Time course and dose response of relaxin-mediated renal vasodilation, hyperfiltration and changes in plasma osmolality in conscious rats. *J. Appl. Physiol.* 95; 1509-1514, October 2003.

Evan Thackberry, Insulin Regulation in AhR-null mice: Embryonic Cardiac Enlargement, Neonatal Macrosomia and altered insulin regulation and response in pregnant and aging AhR-null females *Tox Sci* 76(2), 407-417, August 2003

Danielson LA, Novak JN, Kerchner LJ, Sherwood OD, Ramirez RJ, Moak PA, Conrad KP. Relaxin is the "elusive" renal vasodilator of pregnancy in conscious rats. *J. Clin. Invest* 107 June 2001.

Danielson, L.A., Kerchner LJ, Conrad K.P. Impact of gender and endothelin on renal vasodilation and hyperfiltration induced by relaxin in conscious rats. *Am J. Physiol*, 279:R1298-R1304, May 2000

Danielson, L.A., Sherwood O.D. and Conrad K.P. Relaxin is a potent renal vasodilator in conscious rats. *J. Clin. Invest.* 103:525-533. Feb 1999.

Conrad K.P., Gandley R.E., Ogawa T., Nakanishi S., and L.A. Danielson. Endothelin mediates renal vasodilation and hyperfiltration during pregnancy in chronically instrumented conscious rats. *Am. J. Physiol.* 276 (*Renal Physiol.* 45): F767-F776, 1999.

Danielson, L.A. and K.P. Conrad. Prostaglandins maintain renal vasodilation and hyperfiltration during chronic nitric oxide synthase blockade in conscious pregnant rats. *Circ. Res.* 79:1161-1166 September 1996

Danielson, L.A. and Conrad K.P. Acute Blockade of Nitric Oxide Synthase Inhibits Renal Vasodilation and Hyperfiltration During Pregnancy in Chronically Instrumented Conscious Rats. *J. Clin. Invest.* 96: 482-490. July 1995

Danielson, L.A. and Conrad K.P. Role of Nitric Oxide in Renal Vasodilation and Hyperfiltration during Pregnancy in Chronically Instrumented, Conscious Rats. (Abstract) *Society of Gynecologic Investigation*, March 1995.

Danielson, L.A. and Conrad K.P. Effects of Acute Inhibition of Nitric Oxide Synthase on Renal Hemodynamics and Glomerular Filtration Rate in Conscious Virgin and Gravid Rats. (Abstract) *American Society of Nephrology*, 27th meeting, Oct 1994.

Danielson, L.A., Mosher M., and Conrad K.P. Effects of Chronic Inhibition of Nitric Oxide Synthesis on Renal Hemodynamics in Conscious Virgin and Gravid Rats. (Abstract) *Biomedical Sciences Research Journal*, Oct. 1993.

Appendix F: Catalogue Copy

Catalog Copy

Core Requirements

Biomed 448L*/511	Biochemical Methods/Intensive Intro Biochemistry	3 Credits
Biomed 507	Advanced Molecular Biology	4 Credits
Biomed 508	Advanced Cell Biology	4 Credits
Biomed 555	Problem Based Research Bioethics	1 Credit
Stat 538	Biostatistical Methods Public Health/Medical	3 Credits
MdLab 500	Selected Topics in Laboratory Medicine	2 Credits
MdLab 550	Laboratory Management Seminar	2 Credits

Electives

6 Credits

Masters Degree Non-thesis Plan

MdLab 600: Non-thesis Apprenticeship in research/specialty clinical lab Cytology, Genetics & Cytometry, Biochemistry, Cell Biology or Immunology	10 Credits
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Total: 35 Credits

Typical Full-Time Student Year:

Year One:

Fall:	*Biomed 507/508: Adv Molecular Bio 1 and 2	8 Credits
	*Biomed 555: Problem Based Research Bioethics	1 Credit
	*MdLab 600: Selection of laboratory	1 Credit

Spring:	*Biomed 448L*: Biochemical Methods *or*	3 Credits
	*Biomed 511: Introductory Biochemistry	3 Credits
	*MdLab 600: Selection of laboratory, begin apprenticeship: Fulfill Required Skill List for particular lab	3 Credits
	*MdLab 550: Clinical Lab Management Topics Course	1 Credit

Summer:	*MdLab 600: Apprenticeship	2 Credits
	*MdLab 500: PBL/Lab management course	2 Credits
	*MdLab 550: Clinical Lab Management Topics Course	1 Credit

Year Two:

	*Stat 538: Biostatistical Methods 1	3 Credits
	*MdLab 600 : Apprenticeship continues	4 Credits
	**Electives: hours taken from list below	6 Credits

Summer: Presentation of Final Project (Mater's Exam)

*Core courses **Electives:

Elective Courses:

Techniques:

- Biomed 524 (1): Electron Microscopy
- Biomed 522 (3): Experimental design and methods in Molecular/Cellular Biology
- 546 (4): Advanced Techniques in Light Microscopy
- Chem 566 (3) Spectroscopy

Neurosciences:

- Biomed 509 (3): Principles of Neurobiology
- Biomed 532 (3): Neurochemistry
- Biomed 533 (4): Neurophysiology and Neuroanatomy
- Biomed 535 (1): Neuroscience Seminar

Cell Biology/Physiology

- Biomed 510 (3): Physiology
- Biomed 515 (3): Cancer Biology
- Biomed 516 (3): Molecular Genetics and Genomics
- Biomed 576 (3): Molecular and Cellular Pharmacology
- Biomed 580 (3): General Toxicology
- Biomed 644 (3): Mechanisms of Gene Expression
- Biology 544 (4) Genomes and Genomic Analyses
- Biology 510 (3) Genome and Computational Biology

Immunology/Infectious Disease:

- Biomed 514 (3): Immunobiology
- Biomed 652 (2): Immunopathogenesis

Master of Science in Clinical Laboratory Sciences Program Requirements

The Master of Science in Clinical Laboratory Science degree program follows a required four semester graduate level curriculum, which begins each year during the summer semester.

Resources limit each class size to no more than 5 students. In addition to tuition, housing, books and other usual school expenses, student fees of \$500.00/semester cover lab supplies and special course fees. Fees are subject to change on a yearly basis. Students are responsible for transportation fees to and from externships at off campus sites. The CLS master's degree program is a professional degree that does not require a written thesis but in its stead and apprenticeship program of 1 year with a particular mentoring laboratory provided mainly through the research faculty of the Department of Pathology at the University of New Mexico.

Appendix G: Detailed Course Descriptions

Biomed 448: Biomedical Methods (3 credits): Biochemical techniques including chromatographic and electrophoretic purification of enzymes, determination of enzyme parameter, fractionation of subcellular organelles, isolation of chromatin, biosynthesis of protein, analysis of DNA

Biomed 511: Intensive Introductory Biochemistry I (4 credits): An introduction into physical and chemical properties of proteins and enzymes, enzymatic catalysis, structure, synthesis and processing of nucleic acids and proteins; structure and control of genetic material

Biomed 507: Advanced Molecular Biology (3 credits): The course covers the structures and functions of nucleic acids and proteins, mechanisms and macromolecular synthesis and principles of enzymology

Biomed 508: Advanced Cell Biology (4 credits): Course covers advanced topics in cell biology, including microscopy, the nucleus, protein and membrane trafficking, cytoskeleton signal transduction, cell cycle and division and extracellular matrix.

Biomed 555: Problem based Research Bioethics (1 credits): This is a problem-based discussion course on topics in bioethics such as publication credits and authorships; conflict of interest and fraud, scientific misconduct, human genomics and other relevant issues

Stats 538: Biostatistical Methods 1 for Public Health and Medical Sciences (3 credits): Covers basic statistical methods, including statistical summaries and inference. Methods of summarizing data include graphical displays and numerical summaries. Statistical inference includes hypothesis testing and confidence intervals. Methods for continuous and categorical data are studied

MedLab 500: Pathology Course (2 credits) *Selected Topics in Laboratory Medicine* course: A new course over a 9 week period. Faculty lecturers will be drawn principally from the Pathology Dept, based upon expertise in running a clinical or research lab. Several case studies will be developed to provide problem-based exposure to lab management issues.

Proposed topics (2 hours or one case/week):

1. Personnel management
2. Managing the business/financial side of research lab (ordering, grants accounting)
3. Laboratory support of investigator grant applications
 - a. Budget Preparation
 - b. Importance of Preliminary Data and human/animal approvals
 - c. Introduction to major funding agencies, grant formats, timelines
 - d. Expectations when the grant is funded
4. Data gathering and data management in the research lab
5. Principles of scientific writing.
6. Special problems related to human research.
 - a. Preparing an application to the IRB
 - b. Human Resources, HIPPA regulations
 - c. Introduction to Clinical Trials process

7. Process of introducing a new test into a clinical lab
 - a. Business plan preparation
 - b. Criteria for test development (market, clinical benefit, cost, etc).
8. Special problems in the research lab.
 - a. Teamwork. Collaborations in and out of lab maximize strengths.
 - b. Learning new techniques, assay development
 - c. Importance of reading the primary literature and staying current in your scientific knowledge base.
 - d. Effective oral presentations
9. Regulatory Compliance:
 - a. Federal regulations review and compliance issues:
 - b. State, local and Industry regulations

MedLab 550: Selected Topics: Laboratory Management Seminar (2): An advanced graduate-level course in which current information important in clinical techniques and administration of a clinical laboratory will be discussed. The course is a problem-based learning model given by multiple instructors/lab technologists, Pathology Research and Clinical Faculty.

MedLab 600: Clinical Rotations (9 credits): Clinical and research rotations in laboratories, including viral, molecular, research. Student will visit laboratories and identify a laboratory mentor during the first semester (1 credit). Student may affiliate with either a clinical or basic research laboratory.

1. Spring: Laboratory apprenticeship begins and continues through year 2 for a total of 4 semesters (Spring, Summer, Fall, Spring).
2. At matriculation, student must present documentation of a skills list, with a 1 page written evaluation by the laboratory director. (Individual skills lists will vary based upon the particular laboratory)
3. Apprenticeship is intended for the student to: a) become familiar with operation of a research/clinical lab; b) learn specific laboratory techniques; c) apply new skills to specific problems and design/troubleshooting protocols; d) provide a framework for the student's career objectives in either a clinical or research laboratory setting.
4. Students should document at least one oral presentation during their laboratory research experience, related to that experience. The oral format may be in the context of a laboratory group meeting, a poster or oral presentation at a scientific meeting, a faculty committee convened formally for the presentation, or another appropriate forum designated by the laboratory mentor.

Appendix H: Admission and Student Promotion Standards

The following admission standards and student promotion standards are outlined for the Master of Science in Clinical Laboratory Science Program. Formal admission to the University is an initial requirement for admission to the Master of Science Degree Program in Clinical Laboratory Science. Applications for graduate admission are available from the Program of Medical Lab Sciences, University of New Mexico. Acceptance to the program will be recommended by the Department of Pathology.

Application process for students:

Transcripts, test scores and letters of recommendation submitted to the University of New Mexico for admission become the property of the University and will not be sent elsewhere or returned to the student. Applicants are responsible for ascertaining the additional specific application materials the graduate unit requires (such as GRE scores, portfolios or writing samples).

The University of New Mexico offers domestic students two options for applying for admission.

1. **Online Application (Domestic Students Only).** The online application can be found at the Graduate Studies Web site: (<http://www.unm.edu/grad>). Click on “Admissions.” A \$40 non-refundable Application Fee will be charged with the online application. Credit card required. To complete the online application process, students must submit two official transcripts (unopened) from each academic institution (except UNM) previously attended to the Office of Graduate Studies by the academic unit’s published deadline:
2. **Hard Copy Application (Domestic Students Only).** The following materials must be submitted to Graduate Studies by the academic unit’s published deadline:
 - a. A completed and signed Application Form
 - b. A Residency Form
 - c. A non-refundable \$40 Application Fee*
 - d. Two official transcripts (unopened) from each academic institution (except UNM) previously attended

The following materials must be submitted directly to the Medical Laboratory Sciences Program whether you apply on line or in hard copy:

- a. Letter of Intent
- b. Sealed Letters of Recommendation
- c. Appropriate national certification award
- d. Additional departmental materials if the student is not a certified Clinical Lab Scientist

NOTE: Do not list study abroad programs separately on the application form if they are included as part of a degree program from an accredited U.S. institution.

***Application fee waivers are currently available for McNair fellows and “Project 1000” participants.**

Hard copy applications may be requested directly from the graduate units or downloaded from the Graduate Studies Web site (<http://www.unm.edu/grad>).

The Graduate Studies office holds application files for two years.

Deadline: Applications are due no later than February 15th. Admission is for the summer semester. Those applicants who are provisionally selected will be notified in May. All applicants will be notified of their admission status. Selection will be given to qualified persons regardless of their race, color, religion, national origin, age, qualified disability or military involvement. Equal opportunity for admission is given to all qualified applicants.

Advisement sessions are available from the Program of Medical Lab Sciences. Call the office at (505) 272-5434 for an appointment.

Graduation Requirements

- A. Satisfactory completion of all graduate courses.
- B. Students who have completed graduate-level course work (at a B level or higher) at an accredited institution other than UNM may apply for the credit(s) to be transferred.
- C. Students must maintain a 3.00 GPA or higher.
- D. Student must complete the Master's Apprenticeship Requirement in an approved laboratory on the Health Sciences Campus.
- E. All work toward a Master degree including transferred coursework must be completed within a seven-year period.
- F. Students must inform their graduate unit and the Office of Graduate Studies in writing of their intention to graduate at the end of a particular semester by submitting a "Notification of Intent to Graduate" form.
- G. Unanimous recommendation for graduation by the full-time faculty of the Medical Lab Sciences Graduate Program, the Department of Pathology and the School of Medicine.

Appendix I: Assessment Surveys

The following table will be utilized to disseminate the results of the program goals:

**UNIVERSITY OF NEW MEXICO
Med Lab Sciences Program
ASSESSMENT OF GOALS – GRADUATE EDUCATION**

Goal #1: Prepare graduate students through appropriate academic and clinical education to be qualified clinical laboratory scientists utilizing competency-based curriculum.

Evaluation Mechanism	Expected Results	When Assessed	Person Responsible	Results Achieved	Dissemination	Program Improvement
Student Performance Grades	>96% passing	At the end of each semester	Course Directors			
Clinical Rotation Sites Satisfaction Surveys	>85% rating student “yes”	Spring of each academic year	Lab Manager			
“Do you feel you received professional and competent skilled lab personnel”						
Alumni Survey	>85% rating student	1, 5,10 yr following graduation	Graduate Program Director			
Employer Survey	>85% rating student	One year following graduation	Graduate Program Director			
Graduate Exit Survey	Curriculum evaluated as “appropriate” by 90% of graduate students	Final semester of Graduate School	Graduate Program Director			
Graduate Student Focus Group	Informal assessment feedback from students in regard to the semester just completed	End of each semester	Graduate Program Director			

Goal #2 Provide an excellent experience for the student while learning comprehensive research laboratory skills in research and/or clinical laboratories

Evaluation Mechanism	Expected Results	When Assessed	Person Responsible	Results Achieved	Dissemination	Program Improvement as a Result of Data Analysis
UNM/Private Research Lab Student Satisfaction Survey	>85% rating student "yes"	Spring of each academic year	Lab Manager			
Private Research Lab Competency Skill List	>90% performance grade	Each semester	Course Director			
Professional Development Assessment	>90% performance grade	Each semester	Faculty			

Goal#3: Create a positive environment through the provision of development programs that facilitate continued growth and enrichment of all students and faculty.

Evaluation Mechanism	Expected Results	When Assessed	Person Responsible	Results Achieved	Dissemination	Program Improvement as a Result of Data Analysis
Promotion and Tenure Evaluations: Teaching Research Service	100% receive promotion or tenure	End of each academic year	Program Director			
Faculty participation in development activities	80% participation in leadership conferences	Each of each academic year	Program Director			
Average number of publications or presentation of full time faculty	Average one per year	End of each academic year	Program Director			
Faculty participation on State, National and International Organizations	Average of one committee/organization per year	Annually	Program Director			
Student	90%	Annually	ASCP			

participation	participation		director			
Student publications and presentations local, national and/or international	90% participation	Annually	Graduate Program Director			

Goal #4: Recruit the highest quality of students.

Evaluation Mechanism	Expected Results	When Assessed	Person Responsible	Results Achieved	Dissemination	Program Improvement as a Result of Data Analysis
Number of applicants	15 per year	Annually	Admissions Committee			
Overall GPA of entering class	Average 3.25	Annually	Admissions Committee			
Number of minority students entering class	30% of class	Annually	Admissions Committee			
Number of recruitment programs presented	15 per year	Annually	Coordinator of Recruitment Activities			

Appendix J: Impact Statements for CIRT/Library



THE UNIVERSITY OF NEW MEXICO
HEALTH SCIENCES LIBRARY
AND INFORMATICS CENTER

MSC09 5100
1 University of New Mexico
Albuquerque, NM 87131-0001
(505) 272-2311

August 27, 2004

To: Kathleen Sena, University Registrar

Re: Library Impact Statement, New master's degree in Medical Laboratory Sciences

I have reviewed the degree request document and curriculum for potential impact on the collections of the Health Sciences Library and Informatics Center.

Dr. Danielson has provided me with a list of core journal titles for medical laboratory sciences. We have access to all but one title.

We should be able to address the bioethics and research design aspects of the program with our existing collection.

My area of concern is laboratory management. Our book collection is not strong in that area. It would be helpful if the school could contribute funds for the first few years of the program to help us build that section of the collection.

The proposed new degree would have some, but not a great deal of impact on the HSLIC collections.

Sincerely,

Christee King, MLS
Collection Resources Coordinator

Cc: Lee Danielson, MT, PhD