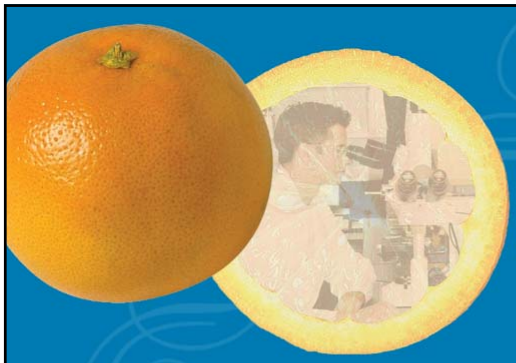

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# An Integrated Approach to Laboratory Science: The WVU Experience


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Associate Dean for Faculty Services
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West Virginia University


## Conflict of Interest

- No conflicts of interest to disclose

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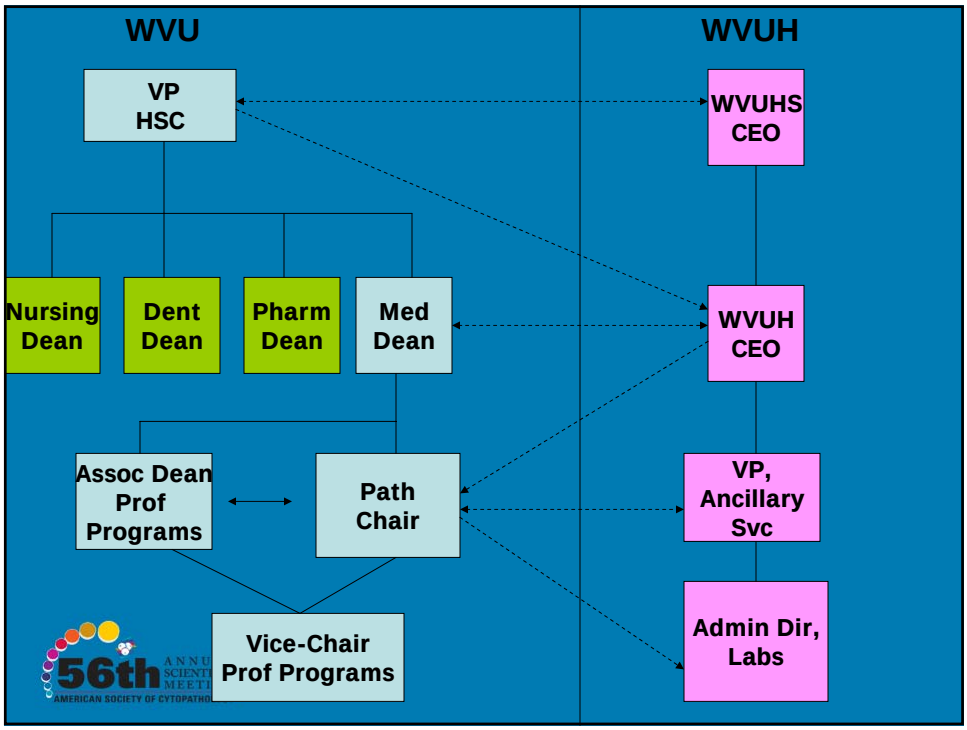
Surgical Pathology


WVU
WVUH
VP HSC
WVUHS CEO
Nursing Dean
Dent Dean
Pharm Dean
Med Dean
WVUH CEO
Assoc Dean Prof Programs
Path Chair
VP, Ancillary Svc
Vice-Chair Prof Programs
Admin Dir, Labs
56th

## A Perfect Storm: FY 2002

- Declining enrollment in CLS program: 20 students total (junior and senior)
- Decreasing state support (14% cut)
- WVU has low undergraduate tuition ($5000 FY09)
- Priority Action Team (PAT) to cut low-margin, low-mission programs – targets CLS program

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## Lab Workforce: By the Numbers

- **#of technologists and technicians needed to replace retirees by 2014: 81,000**
- **# of technologists and technicians needed to fill new positions by 2014: 68,000**
- **Average age of the laboratory workforce: 49.2 years**
- **% of workforce within 10 years of retirement: 40**
- **% of laboratories experiencing difficulty hiring: 44**
- **# of NACCLS-accredited MT education programs in 1985: 770; In 2007: 222**
- **# of accredited CT education programs in 1994: 65; In 2008: 39**
- **# of CLS/MT program graduates in 1977: 6529; In 2005: 2141**

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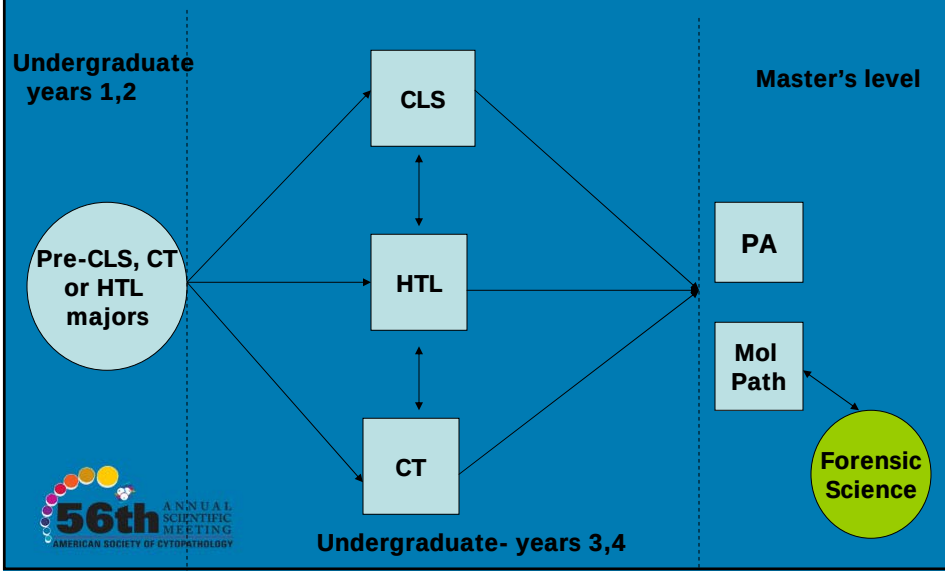
## Grow or Die: The Vision




## Business Plan

- Programs will be profitable or at least budget neutral (increased students, new HSC fees, and direct admit students to count for HSC)
- PA program will increase enrollment in CLS (early admission for CLS/HT students)
- More students with fewer faculty: an integrated curriculum
- HTL program director also manages Tissue Bank/Translational Pathology Cores prior to implementation
- WVUH support

## Core Curriculum for CLS and HTL

| | |
|---|---|
| • PATH 300 Introduction to Pathology | 3 |
| • PATH 320 Basic Clinical Biochemistry | 3 |
| • PSIO 441 Mechanisms of Body Function | 4 |
| • PATH 380 Introduction to Immunology | 1 |
| • PATH 303 Laboratory Applications | 2 |
| • MICB 323 Microbiology | 5 |
| • MTEC 329 Basic Clinical Chemistry | 1 |
| • MTEC 465 Laboratory Management* | 2 |
| • MTEC 403 Community Service Practicum | 1 |
| • MTEC 475 Medical Relevance | 2 |
| • MTEC 402 Rural Health Practicum | 1 |
| • Total (~1/3 of each program) | 25 |

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## Integrated curriculum- Fall of Junior Year

**CLS**

- Intro to Path - 3
- Clin Biochem - 3
- Mech of Body Fcn - 4
- Intro to Immuno - 1
- Lab applications - 2

- Total 13

**HTL**

- Intro to Path - 3
- Basic Clin Biochem-3
- Mech of Body Fcn - 4
- Intro to Immuno - 1
- Lab applications - 2
- Intro Human Anat - 3
- Total 16

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## Integrated curriculum: Spring of Junior Year

**CLS**

- Microbiology – 5
- Basic Clin Chem - 1
- Resch, Ed Method- 2
- Intro Heme - 3
- Parasitology - 2
- Mycology – 1
- Clin Microscopy - 1
- Urin /Fluids – 1
- Total 16 hours

**HTL**

- Microbiology – 5
- Basic Clin Chem - 1
- Resch, Ed Method – 2
- Microanatomy – 3
- Med Terminology – 1
- Total: 12 hours

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## Integrated curriculum- Summer Junior Year

**CLS**

- Hematology – 3
- Instrumentation – 3
- Total: 6

**HTL**

- Stain Techniques- 4
- Histotechnique I - 3
- Total: 7 hours

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## Integrated curriculum: Fall of Senior Year

**CLS**

- Lab Manag – 2
- Rural Hlth pract - 1
- Clin Micro – 3
- Bld Bank - 3
- Clin Chem – 3
- Clin Immuno – 2
- Total: 14

**HTL**

- Lab Manag - 2
- Rural Hlth pract - 1
- Histotechnique II- 3
- Staining Tech- 4
- Clin Histo Intern- 4
- Total: 14

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## Integrated curriculum: Spring of Senior Year

**CLS**

- Med Relevance – 2
- Comm. Svc – 1
- Lab rotations – 14
- Total: 17

**HTL**

- Med Relevance – 2
- Comm Svc – 1
- Practicum – 12
- Total: 15

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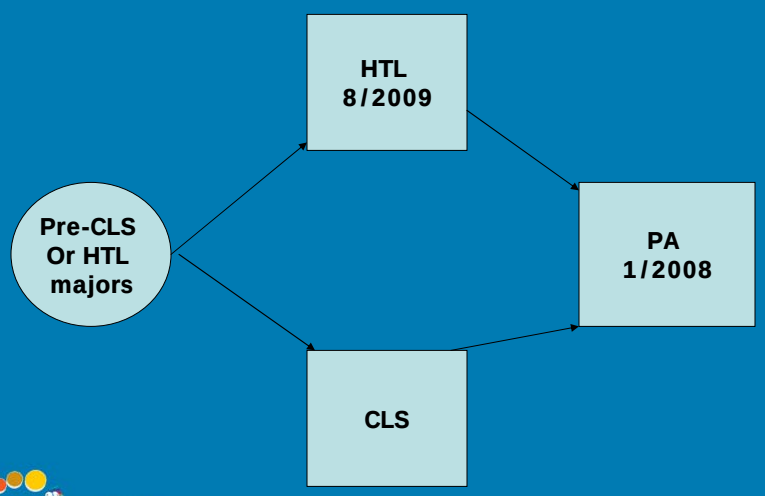
## 5th year option for MTs

- Summer semester
  - Microanatomy – 3
  - Staining Techniques – 4
  - Histotechnique – 3
  - Total: 10
- Join senior year program for HTL
- Dual MT/HTL certification in 5 years

## Reality 2008



## PA program

- Graduate tuition higher
- More out-of-state students
- 6 students year 1
- 10 students year 2
  - 6 direct admits
  - 4 admissions

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## CLS Program: 2008

- 33 students per year
- Many direct admits
- Waiting list of 17 last year
- Limiting factor: Clinical sites and lab sections (space and faculty)

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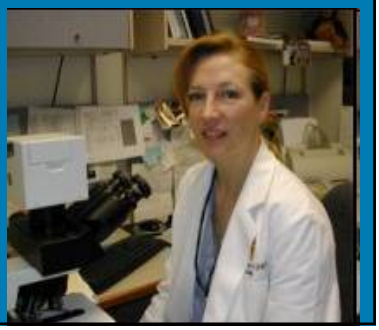
## Challenges in implementation

- Personnel
- Funding
- Time
- Space

## Personnel

- Labor costs held to minimum (integration)
- 1 additional CLS faculty and HTL faculty
- Additional HTL faculty possible
- Student growth: 20 to 106 (when all programs fully operational); faculty growth 5 to 9-10
- *The right people: priceless;* for all the rest there's Mastercard



## Funding

- Educational programs
  - Tuition and fees for increased number of students
- Biotech/contract revenue (joint appointment)
- Dean's office support (temporary)
- Hospital support (temporary)

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## Time

- To maintain budget neutrality, we have made created programs 'on the margin'
- Our faculty have joint teaching, clinical, and research obligations
- Strain on faculty and vice-chair – can only start 1 program at a time

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## Space: The Final Frontier

- Limit of future growth
- Faculty office space
- Classroom space
- Lab space
- Clinical rotation sites

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## The future of cytotechnology programs

- ? Decreased demand
  - HPV screening
    - Primary
    - Adjunct
  - Vaccination
  - Automated screening
- Programs are closing

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## Future of cytotechnology programs

**"It is better to light one candle than to curse the darkness."**

*– Motto of the Christopher Society*

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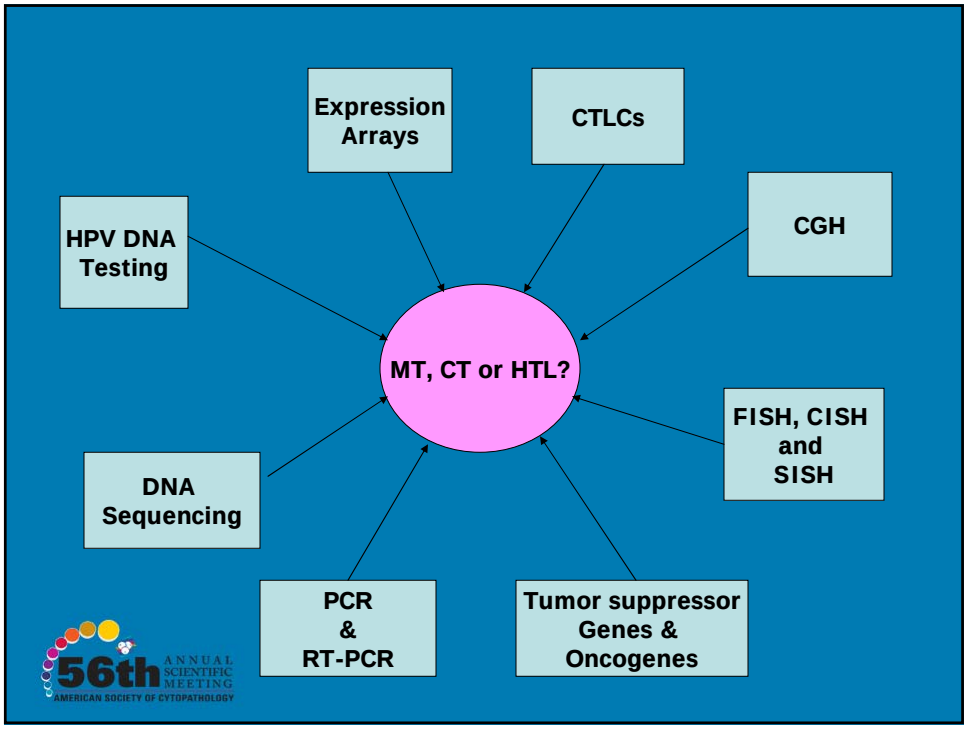


## Future plans at WVU

- Masters of molecular pathology
- Separate CT track and/or addition of CT to HTL track
- Add-on year for practicing CTs in HTL

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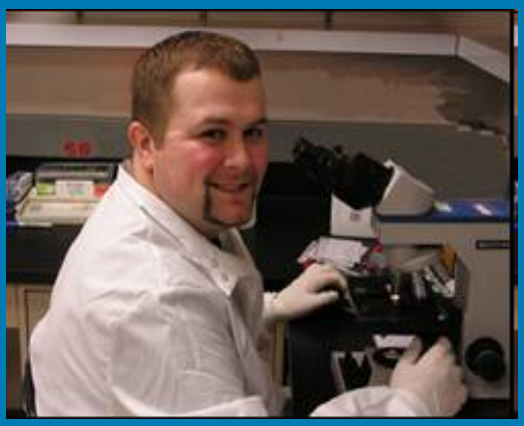
## What does the laboratory professional of tomorrow look like?



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## My thanks to the people who really did this:

- Drs. Prescott and Brick (past and present dean, SoM)
- Dr. Mary Beth Mandich, Assoc Dean for Professional Programs
- Steve Tancin, VP and Judy McDaniel, Lab Director, WVUH
- Dr. Martha Lake, Pathology Vice-Chair for Professional Programs and CLS program director
- Cheryl Germain, Director, PA program
- Kim Secrest, HTL Program Director
- WVU Dept of Pathology Faculty, Residents, Staff, and Students

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# Multi-disciplinary Education Models:

## *A Combined CT/PathA/MP Program Sequence*

Shirley E. Greening, MS, JD
Thomas Jefferson University

Conflict of Interest

*None*

Context: Future

2008 Trends in Clinical Pathology Laboratory Management 29

**Trend #7**

**Skilled Labor Crisis Looms For Clinical Laboratory Industry**

Last year, Dark Daily reported that a shortage of histotechnologists and sub-specialist pathologists was a problem for manywould affect laboratories across the United States. This year, Dark Daily predicts that that shortage will expand to include medical technologists, cytotechnologists, histologists, and other professionals with the technical skills clinical labs need.

In order to attract qualified histotechnolgists and sub-specialist pathologists, pathology laboratories may have to become very proactive in both educating new entrants to the profession and in recruiting experienced personnel.

## *Context: Background*

- **Mass lay-offs then "binge" hiring cycles at hi-volume labs**
- **Small "community labs" with need for X-skilled techs**
- **Hospital-based labs doing more molecular testing *(not necessarily in AP)* and higher volume surgicals, with ↑need for adjunct testing**
- **Relatively scarce supply of Histotechs & Path Asst's**

- **Desire/need to grow program/department options at graduate level**
- **Offer programs that are "exciting", attractive to potential applicants**
- **Avoid complacency**

## *Why Go the "AP" Route?*

- From practice perspective
  This is where Cytotechs can shine
  - Morphologic Expertise
  - Laboratory operations knowledge
  - Completes CPC circle

- From professional perspective
  - Resistance from CLS re: integration of roles; duties
  - "Culture shock" for lab organizational patterns

*May be a "battle for another day"*

- From academic perspective
  - flexibility to design new/different education models
  - limitations of departmental expertise

## *Process for CT+PathA+MP Decision*

- *National Program Comparison*
  - Admission Requirements
  - Capacity
  - Location
  - Tuition/Fees
  - Coursework

- *Curriculum to Standards Comparison*
  - *Required* Prerequisites
  - *Required* Professional Sequence
  - *Required* Cognates

- *Curriculum/Standards/BOR Exam Content Comparison*
  - *Required* Prerequisites
  - *Required* Professional Sequence
  - *Required* Cognates

# Accreditation "Competency Statements"

**Cytotech** [*Competencies*]

- laboratory operations
- general and systemic pathology
- specimen processing method
- specimen acceptability
- preparation of stains and solutions
- Instruments: collection/processing
- quality control: specific procedures
- standard operating procedures
- procedural courses of action
- standard/special lab procedures
- corrective actions
- clinical data
- biologic behavior
- health and disease processes
- differential diagnosis
- sources of error
- Ancillary testing
  - HPV DNA testing
  - Flow cytometry
  - Immunohistochemtechniques
  - FISH; PCR
  - Immunophenotyping
  - Automated screening devices

**Path Ass't** [*Cognates*]

Professional Sequence Courses:

- Anatomic Pathology
- Management
- Gross Autopsy Pathology
- Gross Forensic Techniques
- Gross Peds Path Techniques
- Gross Surgical Path Techniques
- Path/Tox Specimen Techniques
- Educational Methodologies

Required Cognates:

- Clinical Pathology
- Computerization/Info Systems
- Embryology
- General/Systemic Human Path
- Histology/Microscopic Anatomy
- Human Anatomy
- Human Physiology
- Medical Ethics
- Medical Microbiology
- Medical Photography
- Medical Terminology
- Safety Regulations

**MP/DMS** [*Competencies*]

- collection, transport, handling
- molecular testing for laboratory utilization and clinical decisions
- techniques utilizing instruments and info. management systems
- preventive and corrective maintenance; troubleshooting; problem resolution
- new technologies, procedures or diagnostic correlations
- Interpreting and evaluating data
- quality control
- quality assurance; validity measurements
- information systems, data management and archival storage;
- laws, regulations and accrediting standards and guidelines
- resource management strategies
- general laboratory safety, biohazard/radioactive containment and waste disposal;
- leadership, professional, ethical conduct and interpersonal skills
- professional career development.

# Examination Content Guidelines

## Cytotech

| SUBTEST | CT |
|---|---|
| Gynecological Cytology | 38% |
| Non-Gynecological Cytology | 32% |
| Fine Needle Aspiration | 12% |
| Laboratory Operations | 18% |

| Subtest Percentages of Non-Gynecological Cytology | CT | SCT |
|---|---|---|
| - Respiratory System | 10% | 9% |
| - Genitourinary System | 10% | 8% |
| - Body Cavity Fluids | 10% | 9% |
| - Other | 2% | 2% |

## Molec Path

| SUBTESTS | MP |
|---|---|
| Molecular Science | 25-30% |
| Molecular Techniques | 35-40% |
| Laboratory Operations | 15-20% |
| Applications of Molecular Testing | 15-20% |

## Path Ass't

| SUBTEST | PA |
|---|---|
| General Pathology | 10 – 20% |
| Systemic Pathology | 40 – 50% |
| Anatomic Pathology Techniques | 10 – 15% |
| Anatomy | 10 – 15% |
| Autopsy Pathology | 10 – 15% |
| Laboratory Operations | 5 – 10% |

## Cytotech Certification Content

**VII. LABORATORY OPERATIONS**
(CT, 18%; SCT, 36%)
A. Quality Management
1. Quality control
2. Quality assurance methodol
3. Risk management
B. Cytopreparation Techniques/Ins
(to include collection, processing
techniques)
1. Principles
2. Procedures
3. Troubleshooting
4. Fixatives and stains
5. Validation
C. Safety and Infection Control (e.g
MSDS, NFPA, NIOSH)
D. Compliance
1. Governmental agencies (e.g.
2. Laboratory accreditation (e.g.
JCAHO)
E. Management*
1. Work flow, scheduling and pr
2. Laboratory information syster
technology
3. Policies and procedures
a. Accreditation
b. Operations manuals
c. Quality assurance plan
d. Clinical and Laboratory St
Institute Guidelines
4. Financial management
a. Operating budget
b. Capital budget
c. Accounting principles (e.g., balance sheets, income statements, cash flow, depreciation)
5. Personnel management
a. Principles of supervision
b. Hiring/interviewing/selection
c. Motivation/discipline/counseling
d. Job descriptions
e. Performance standards, evaluation, and competency assessment
6. Communication
(principles of communication)
G. Molecular Techniques and Applications (e.g., nucleic acid amplification, molecular markers)

**I. GYNECOLOGICAL CYTOLOGY**
(CT, 38%; SCT, 20%)

**II. RESPIRATORY SYSTEM**
(CT, 10%; SCT, 9%)

Body sites to include:
- Upper respiratory system
- Lower respiratory system

A. Anatomy, Physiology and Embryologic Origins
B. Histology and Normal Cellular Morphology
C. Pathology, Cytopathology, Biologic Behavior
1. Congenital anomalies
2. Benign lesions/reactions
a. Inflammation

**III. GENITOURINARY SYSTEM**
(CT, 10%; SCT, 8%)

Body sites to include:
- Kidney
- Ureters
- Bladder
- Urethra
- Male genital organs

A. (SEE II.A)
B. (SEE II.B)
C. (SEE II.C.1-5)

**IV. BODY CAVITY FLUIDS**
(CT, 10%; SCT, 9%)

Body sites to include:
- Pleural, peritoneal and pericardial cavities
- Central nervous system
- Other (e.g. synovial, hydrocele, amniocentesis)

A. (SEE II.A)
B. (SEE II.B)
C. (SEE II.C.1-5)

| SUBTEST | CT |
|---|---|
| Gynecological Cytology | 38% |
| Non-Gynecological Cytology | 32% |
| Subtest Percentages of Non-Gynecological Cytology (CT / SCT) | |
| - Respiratory System | *10% / 9%* |
| - Genitourinary System | *10% / 8%* |
| - Body Cavity Fluids | *10% / 9%* |
| - Other | *2% / 2%* |
| Fine Needle Aspiration | 12% |
| Laboratory Operations | 18% |

**V. OTHER (e.g. Alimentary, Eye, Skin)**
(CT, 2%; SCT, 2%)

**VI. FINE NEEDLE ASPIRATIONS**
(CT, 12%; SCT, 16%)

Body Sites
- Breast
- Thyroid glands
- Salivary glands
- Lymph nodes
- Bone
- Soft tissues
- Liver
- Pancreas
- Kidney
- Lung
- Adrenal glands
- Other (e.g., ovary, prostate, brain)

A. (SEE II.A)
B. (SEE II.B)
C. (SEE II.C.1-5)

## MP Certification Content

**II. MOLECULAR TECHNIQUES (35-40%)**
**A. Separation and Detection**
1. Electrophoresis
a. Gel
b. Capillary
2. Blotting and probing procedures
3. Probe hybridization
4. In-situ hybridization
5. Nucleic acid purification
**B. Nucleic Acid Amplification**
1. Polymerase chain reaction (PCR)
2. PCR variations (e.g., real-time, nested, multiplex)
3. Branched DNA (bDNA) technology
4. Sequence based (NASBA)
5. Transcription-mediated technology (TMA)
6. Strand displacement amplification (SDA)
7. Other (e.g., hybrid capture, ligase chain reaction, cleavase invader)
**C. DNA Sequence Analysis**
1. Chain terminators
2. Manual gel sequencing
3. Automated sequence analyzer
4. Restriction fragment length polymorphism (RFLP)
5. Other (e.g., pyrosequencing)
**D. Other Techniques**
1. Denaturing gradient gel
2. Denatu
3. Heteroc
conforn
4. Melting

| SUBTESTS | MP |
|---|---|
| Molecular Science | 25-30% |
| Molecular Techniques | 35-40% |
| Laboratory Operations | 15-20% |
| Applications of Molecular Testing | 15-20% |

**I. MOLECULAR SCIENCE (25-30%)**
**A. Nucleic Acid Chemistry**
1. Sugars
2. Bases
3. Chemical structure
4. Associated proteins
5. Mut
**B. Basic M**
1. Rep
2. Trai
3. Exo
4. Trai
5. Chr
**C. Biochem**
1. Poly
a.
b.
2. End

**III. LABORATORY OPERATIONS (15-20%)**
**A. Laboratory Design**
**B. PCR Product Contamination**
1. Prevention
2. Monitoring and detection
3. Elimination
**C. Quality Assurance**
1. Specimen collection, preparation, and storage
2. Reagent selection, preparation, storage, and disposal
3. Assay selection, validation, documentation, result interpretation, and calculation
4. Quality control and proficiency testing
**D. Guidelines and Regulations**
1. Analyte specific reagent (ASR) and CPT coding
2. CLIA, JCAHO, CAP, CLSI, FDA
**E. Personnel**
1. Continuing education
2. Competency
**F. Safety**

**IV. APPLICATIONS OF MOLECULAR TESTING (15-20%)**
**A. Infectious Disease**
**B. Hematology/Oncology**
**C. Genetics**
**D. Other**
1. Histocompatibility
2. Genetic identity (paternity, forensic, and engraftment)
3. Pharmocogenomics

## Path Ass't Certification Content

I. **General Pathology (10 – 20%)**
- A. Cell Injury
- B. Environmental, Toxic and Nutritional
- C. Fluid and Hemodynamic Derangements
- D. Genetic and Metabolic Disorders
- E. Immunopathology
- F. Infectious Diseases
- G. Neoplasia

II. **Systemic Pathology (40 – 50%)**
- A. Blood and Lymphoid
- B. Bone and Soft Tissue
- C. Breast
- D. Cardiovascular
- E. Endocrine
- F. Gastrointestinal
- G. Kidney and Urinary Tract
- H. Liver and Biliary Tract
- I. Nervous System
- J. Pediatric
- K. Perinatal
- L. Reproductive - Female
- M. Reproductive - Male
- N. Respiratory
- O. Skin

III. **Anatomic Pathology Techniques (10 – 15%)**
- A. Autopsy Pathology Techniques
- B. Histological Techniques
- C. Surgical Pathology Techniques

| SUBTEST | PA |
|---|---|
| General Pathology | 10 – 20% |
| Systemic Pathology | 40 – 50% |
| Anatomic Pathology Techniques | 10 – 15% |
| Anatomy | 10 – 15% |
| Autopsy Pathology | 10 – 15% |
| Laboratory Operations | 5 – 10% |

IV. **Anatomy (10 – 15%)**
- A. Gross
- B. Microscopic

V. **Autopsy Pathology (10 – 15%)**
- A. General autopsy
- B. CPC
- C. Forensic

VI. **Laboratory Operations (5 – 10%)**
- A. Informatics
- B. Management
- C. Regulatory
- D. Safety

## 2+3 Integrated MS Program in CT/PathA/MP

### CT/PathA/MP Track Y1 Ugrad — 11 months

**Fall**

| | |
|---|---|
| Fund Clin Exp Techs | 3 |
| Funct Histo with Lab | 3 |
| Princ Cell Analysis | 2 |
| Gyn Cyto/Histo Lecture | 3 |
| Gyn Cyto/Histo Lab | 5 |
| | 16 |

**Spring**

| | |
|---|---|
| Cytoprep Techs | 2 |
| Molec Prep Techs | 2 |
| Histotechniqs | 2 |
| NonGyn Cyto/Histo I | 4 |
| NonGyn Cyto/Histo II | 4 |
| | 14 |

**Summer**

| | |
|---|---|
| CT Practicum | 6 |
| Histotech Practicum | 2 |
| | 8 |

### CT/PathA/MP Track Y2 U'grad/Grad — 12 months

**Fall**

| | |
|---|---|
| Molecular Biology | 3 |
| Microbiology 1 w/ Lab | 3 |
| MedTerm/ClinHx/Dictation | 2 |
| Biochemistry | 3 |
| Toxicology & Bioagents | 2 |
| "Chematology" | 2 |
| | 15 |

**Spring**

| | |
|---|---|
| Pathology w/ Lab | 3 |
| Histopathology Lab | 2 |
| Medical Imaging Techniqs | 3 |
| Molecular Diag. Techniqs | 4 |
| Cell & Molec Diagnostics | 3 |
| Research Project I | 1 |
| | 16 |

**Summer**

| | |
|---|---|
| CT Practicum | 4 |
| PathA Practicum (ClinPath) | 4 |
| | 8 |

+

### CT/PathA/MP Track Y3 Grad — 10 months = 22 mo.

**Fall**

| | |
|---|---|
| Methods in Bioscience Educ. | 3 |
| Medical Anat&Phys (Autopsy + Surg Techs) | 3 |
| PathA Practicum (Peds; E,A+P) | 2 |
| PathA Practicum (Forensics/Tox) | 4 |
| PathA Practicum (Surg Path) | 6 |
| | 18 |

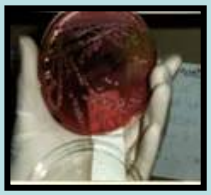
**Spring – Pre-Summer**

| | |
|---|---|
| Reg/Fisc/ML Issues in Lab Mgmt | 3 |
| Research Project II | 2 |
| PathA Practicum (Autopsy) | 6 |
| CT/Molecular Path Practicum | 4 |
| Comprehensive Exam | 1 |
| | 16 |

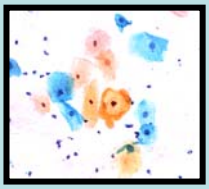
| | |
|---|---|
| Pre-requisites (w/ OrgChem; Micro) | 55-58 |
| Undergrad Credits | 38 |
| Grad Credits | 73 |
| Total | 166-169 |

*All PathA Practica include Molecular/Immunologic/Imaging Techniques as applicable*

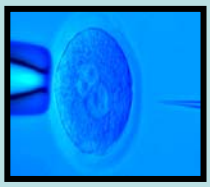
## *Bioscience Technologies Professions at Jefferson*



**Medical Technology /**
***Clinical Lab Scientist***



**Cytotechnology /**
***Cell Scientist***



**Biotechnology / *Applied***
***Molecular Technologist***

## Medical Technology /
## *Clinical Lab Scientist*

| | |
|---|---|
| MT 531. Microbiology I w/ Lab | 3 |

| | |
|---|---|
| Toxicology & Bioagents | 2 |
| "Chematology" | 2 |

*Need to cherry-pick content from*
- MT 523. Clinical Chemistry (3 credits)
- MT 541. Hematology (3 credits)

*Need to add content for Tox/Bioagents*

## Cytotechnology / Cell Scientist

| | |
|---|---|
| LS 311. Functional Histology with add'l Lab | 3 |
| CT 301. Principles of Cell Analysis (L+L) | 2 |
| CT 311. Gyn Cyto/Histo Lecture | 3 |
| CT 312. Gyn Cyto/Histo Lab | 5 |
| CT 3xx. Cytoprep Techs | 2 |
| CT 3xx. Molecular Prep Techs | 2 |
| CT 315. NonGyn Cyto/Histo I | 4 |
| CT 317. NonGyn Cyto/Histo II | 4 |
| CT 325. Cell & Molecular Diagnostics | 3 |
| CT 4xx. CT Practicum | 6 |
| CT 413. CT Practicum | 4 |
| CT 414. CT/Molecular Path Practicum | 4 |

## Cytotechnology / Cell Scientist

| | |
|---|---|
| Histology/Electron Microscopic Techniques | 2 |
| Histopathology Lab *(Autopsy CPC)* | 2 |
| Pathology Lab *(w/ Microscopy Component)* | 3 |

*Need to "resurrect" course content formerly in Cytotech curriculum*

## Biotechnology / *Applied Molecular Technologist*

| | |
|---|---|
| BT 610. Molecular Diagnostic Techniques | 4 |
| *PathA Practicum (Forensics/Tox)* | *4* |

***Forensics Practicum already in Molecular Biology PBC program for 2 cr***

***Need to add competencies for Toxicology***

## Bioscience Technologies *Core Curriculum* (Undergrad or Grad)

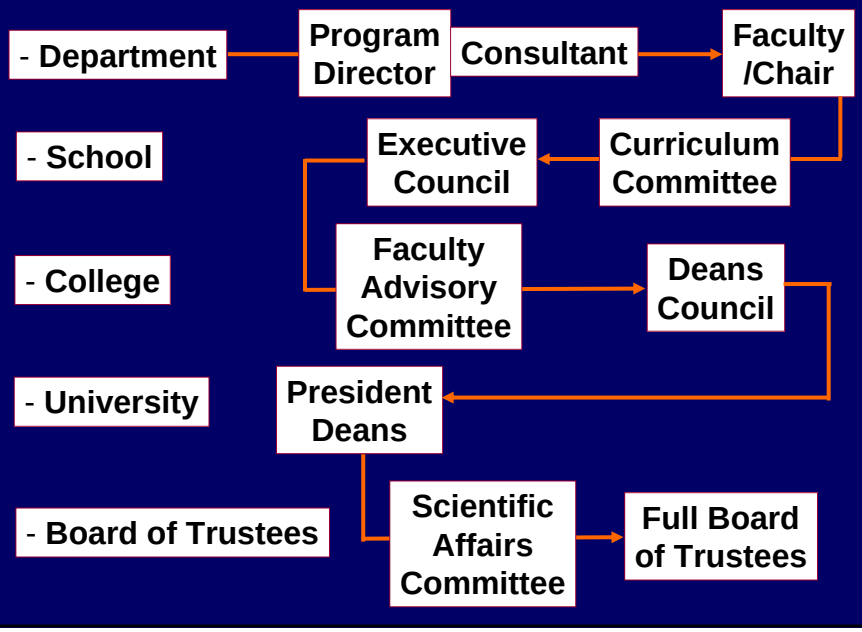
| | |
|---|---|
| LS 303. Fund. Clinical & Experimental Techniqs | 3 |
| LS 501. Molecular Biology | 3 |
| CHEM 504. Biochemistry | 3 |
| LS 613. Pathology w/ Lab | 3 |
| LS 610. Regulatory & Fiscal Issues in Lab Mgmt | 3 |
| LS 640. Methods in Bioscience Education | 3 |
| LS 801. Research Project I | 1 |
| LS 802. Research Project II | 2 |
| LS 816. Comprehensive Exam(s) | 1 |

## Pathologist Assistant
## *New Courses Required*

| | |
|---|---|
| PA 5xx. MedTerm/ClinHx/Dictation | 2 |
| PA 5xx. Medical Imaging Techniqs | 3 |
| PA 6xx. Medical Anat&Phys (Autopsy/Surg Techs) | 3 |
| PA 8xx. PathA Practicum (ClinPath) | 4 |
| PA 8xx. PathA Practicum (Peds; E,A+P) | 2 |
| PA 8xx. PathA Practicum (Forensics/Tox) | 4 |
| PA 8xx. PathA Practicum (Surg Path) | 6 |
| PA 8xx. PathA Practicum (Autopsy) | 6 |

***All PathA Practica to include Molecular/Immunologic/Imaging Techniques as applicable***

## *Development/Approval Process*



## *Combined CT/PathA/MP Curriculum*
## Cons/Challenges

- Existing accredited program already in city
- *Student lab equipment needs change-out*
- Some resistance/apathy from Med Tech and Biotech program directors
- *Practicum site confirmations*
- Cost of supplies, minor equipment (including maintenance) especially for molecular diagnostics
- *Must satisfy multiple accreditating bodies and certifications*

***Lobby for***
***- concurrent rather than sequential certification or combined accreditation***

## *Combined CT/PathA/MP Curriculum*
## Pros/Opportunities

- Only 8-9 PathA programs in US *(some not yet accredited)*
- *Medical Director for PathA already identified*
- Department has bulk of didactic/lab courses needed
- *Department facilities can accommodate additional students*
- Certified PathA identified to help with feasibility study & accreditation application
- *Pathologists & Path Ass'ts identified for adjunct faculty*
- University supports/requires development of graduate level programs
- *former students want PathA education – transitional program possible*
- Students earn MS degree in Bioscience Technologies *(not in separate discipline(s)*
- *Students eligible for CT, PathA and MP certifications*

Thank You