School of Medical Laboratory Science
Beaumont Hospital, Royal Oak

2020 Interview Season

Virtual Laboratory Tour

Purpose:

- Outline the 2020 MLS program curriculum
- Illustrate, via photographs, the various:
  - Student training benches
  - Clinical laboratory benches
  - Beaumont, Royal Oak campus highlights
- Present graduate outcome data
- Share FAQ's from 2020 applicants answered by recent graduates and staff technologists

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Beaumont Laboratory - Royal Oak

Research Institute

Main Hospital

- Among the highest test volume hospital-based laboratories in the country, more than 10 million specialized and routine tests are performed annually.
- The various laboratories are located in the Research Institute building and the Main Hospital.
- Staff include: M.D. pathologists, bio-scientific Ph.D.'s, certified medical laboratory scientists (medical technologists), as well as phlebotomists, clerical and specimen processing assistants.

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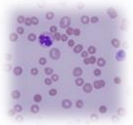
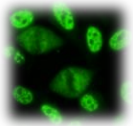
Clinical Pathology - Lab Sections

Blood Bank

Automated Chemistry

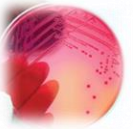


Hematology

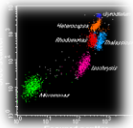


Special Testing & Immunology

Coagulation



Microbiology



Flow Cytometry

Molecular Pathology

Phlebotomy

Ancillary Testing

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MLS Program - 2020

- Sponsored by Beaumont Laboratory in the department of Clinical Pathology at Beaumont Hospital, Royal Oak.
- NAACLS accredited since 1967
- Student learning experiences include rotations on student laboratory benches and live clinical benches within each laboratory section in Clinical Pathology.
- Written and practical exams in each rotation
- Program length = 26 weeks
  - Orientation 1 week
  - Clinical Rotations 24 weeks
  - Final Activities 1 week

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Clinical Rotation Overview

Blood Bank (Transfusion Medicine)

Brent Vasicek, MA, MT(ASCP)

Lead Technologist – Clinical Instructor

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Blood Bank - 2020

- Length
  - 4.5 Weeks (plus 2 days Phlebotomy at beginning)
- Course Highlights
  - QC, QA, cGMP, Transfusion audits on floor
  - Tube, gel, and solid phase methodology
  - ABO Discrepancy Resolution
  - Complex Antibody Resolution
  - Blood component prep, manipulation, crossmatching
  - Moms and Babies Monitoring
    - Titers, Rhogam, fetal cell screens
  - Didactic lectures – recorded and live
  - Special lectures by: HLA Manager, Immucor™ Reps
  - 4 days on live working bench with staff technologists

Blood Bank – Student Lab – 4 Students

- A dedicated student laboratory in it's own room that minimizes distractions for students and instructor.
- This student lab has socially distanced working spaces for 4 students.
- Lab is furnished with necessary lab equipment and instrumentation.
- The round table is utilized for lecture delivery and to hold shared reagents during practice labs.

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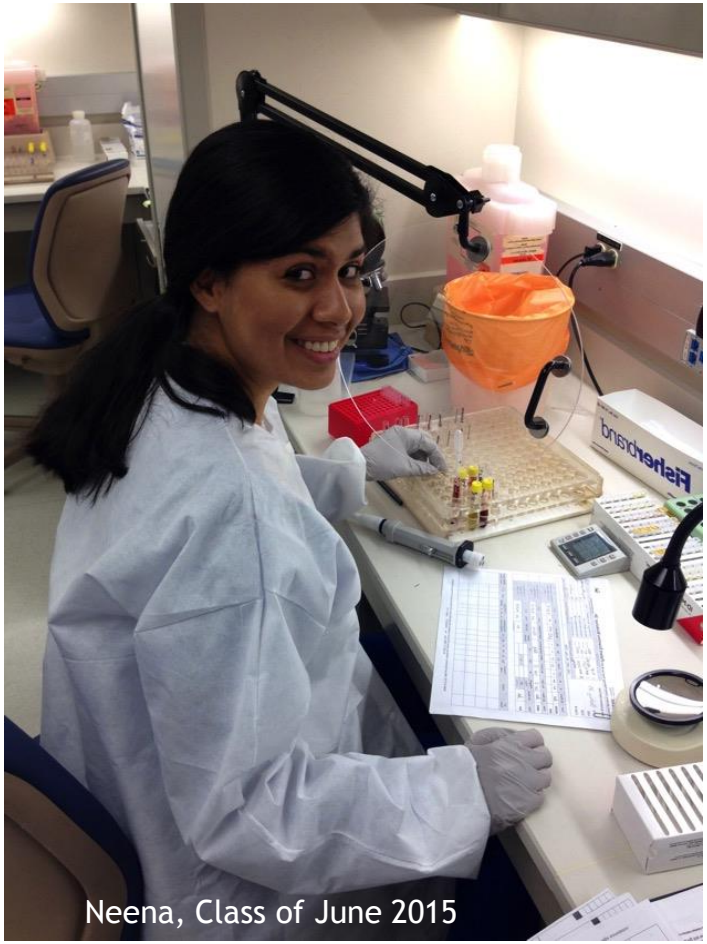
Blood Bank – Student Lab (cont.)


Neena, Class of June 2015

Students gain repetitive hands-on practice before rotating on live working benches


Kirstin, Class of June 2015

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Blood Bank – Technical Bench Rotations

- The Blood Bank (Transfusion Medicine) technical laboratory has 4 main benches:
  - **Triage** (for issuing blood products)
  - **Type & Screen**
  - **Moms & Babies**
  - **Antibody Problems**
- Students rotate one day at each bench.

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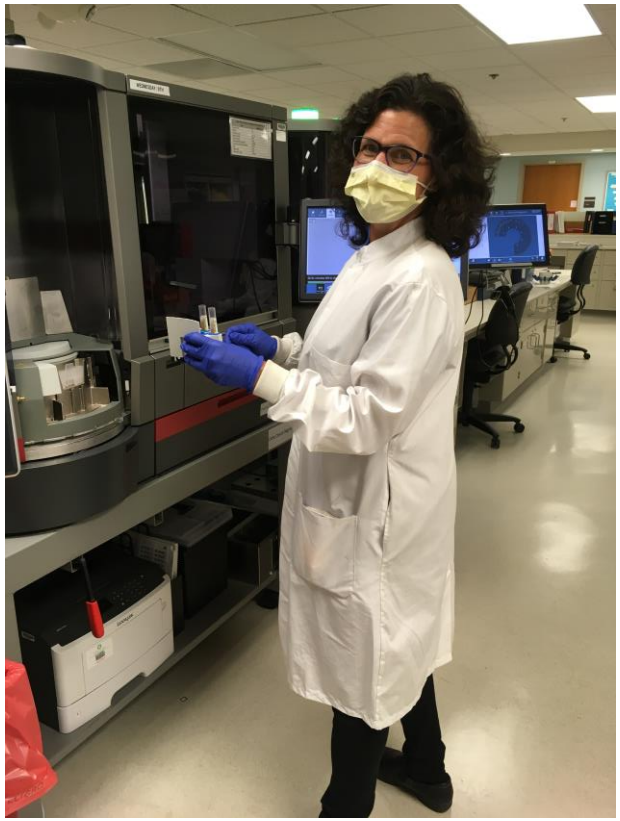
Blood Bank – Technical Benches

Triage - Technologist preparing a massive transfusion cooler containing red cells, plasma, platelets, and cryoprecipitate.

Moms & Babies - Technologist preparing a unit of crossmatched packed RBC's for transfusion.



Type & Screen - Technologist loading a specimen onto the Ortho *Vision*™ to perform patient ABO and Rh typing.

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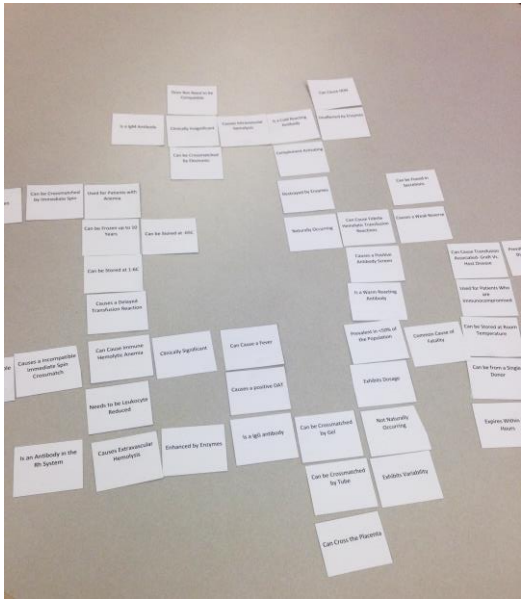
Blood Bank – Student Game Day ☺



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Chemistry / Immunology

Felicia Oleksik, MLS(ASCP) CM

Lead Technologist – Clinical Instructor

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Chemistry / Immunology - 2020

- Length
  - 6.0 weeks – on-site and remote learning
- Course Highlights
  - Week 1 – Introductory didactic lecture and laboratory skills with instructor
  - Weeks 2 thru 6 – Live bench with staff technologists:
    - Core Lab - Automated Chemistry Line Set-up & Resulting – 2 days
    - STAT Lab - Abbott Architect analyzer – 2 days
    - STAT Lab – Blood gases – 2 days
    - Urinalysis - 2 days
    - Special Chemistry (Immunology) - 2 days
      - IFA/Allergies/Electrophoresis
    - Toxicology - 2 days
    - Manual procedures with instructor (1 day)
  - Live and recorded lectures; Case Studies
  - Written and practical exams over major topics

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Chemistry – Student Bench

- A bench and discussion area in the STAT Lab on the 3rd floor of the Hospital is available for student training.

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Chemistry – Technical Bench Rotations

- STAT Lab
  - Abbott *Architect*™ analyzer
    - 2 days
  - Manuals / QC
    - Monospots
    - Urine HCG
  - Arterial Blood Gases
    - 2 days

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Chemistry – Technical Bench Rotations

- Core Lab - Automated Chemistry Line
  - 2 days training on Abbott *Architect*™ analyzers

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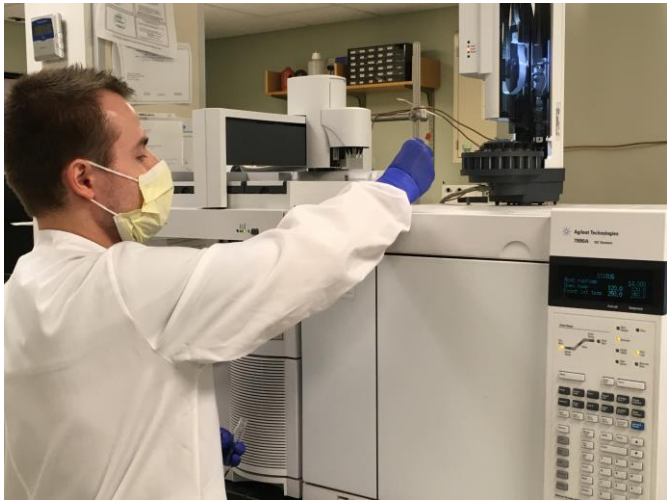
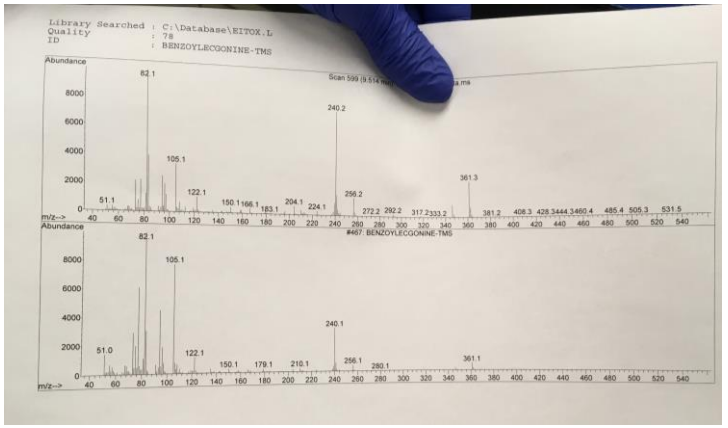
Special Chemistry – Technical Bench Rotation

- Toxicology Lab
  - 2 days



Medical Technologist performing urine GCMS for drugs of abuse



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Hematology / Hemostasis

Sara Wagner, MLS(ASCP) CM

Lead Technologist – Clinical Instructor

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Hematology / Hemostasis - 2020

- Length
  - 6.0 Weeks
- Course Highlights
  - Week 1 – Introductory didactics and laboratory with instructor
  - Week 2-5 – live benches with staff technologists
    - Sysmex Hematology Line
    - Body Fluids
    - Differential
    - Bone Marrow
    - Coagulation
  - PB/BF morphology reviews with instructor on exam days
  - 2 days in Flow Cytometry
  - 1 day Point of Care (Ancillary Testing) self-study

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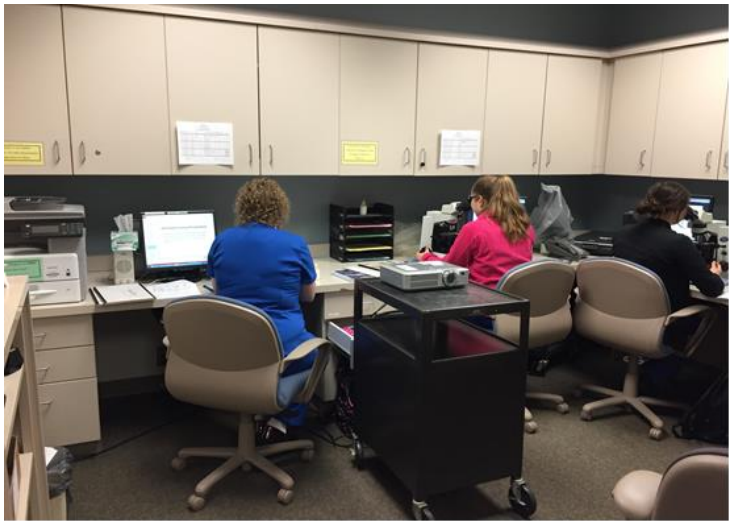
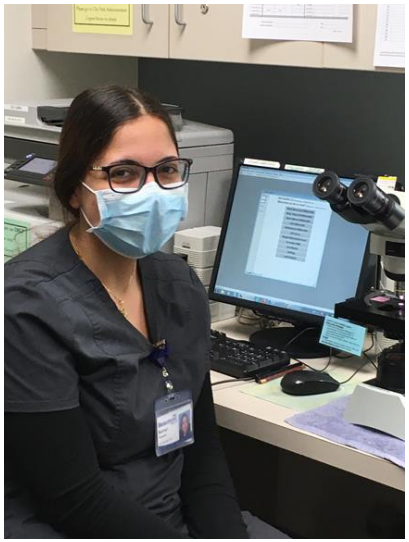
Hematology – Student Lab

- A dedicated training room for “clean” learning activities only (e.g., reading, computer, microscope work) that is free from distraction of clinical labs
- Current student lab has social distance working space for 4 students.
- Didactic lectures are delivered in a classroom, conference room, or in this student area.





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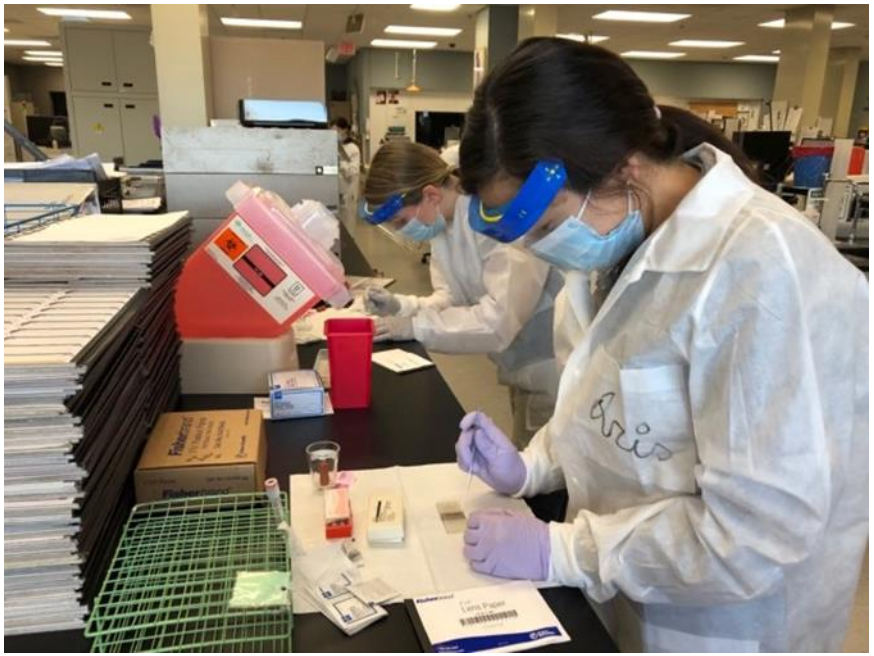
Hematology – Student Wet Bench

- A standing bench area located in the Core Lab for manual test procedure practice.



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Hematology – Technical Bench Rotations

- Sysmex™ CBC-Diff Analyzer

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Hematology – Technical Bench Rotations

- **Morphology Bench**
  - One-on-one student to technologist interaction is essential to the quality of the student's education and training.
  - Students can also utilize the teaching microscope to take photo's for their case presentation.

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Hematology – Technical Bench Rotations

- **Morphology Bench**
  - **Peripheral Blood and Body Fluid Smears**

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Hematology – Technical Bench Rotations

- Flow Cytometry

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Hemostasis – Technical Bench Rotation

- Coagulation ACLTOP700™ Analyzer

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Microbiology

Caroline Loomis, MT(ASCP)

Lead Technologist – Clinical Instructor

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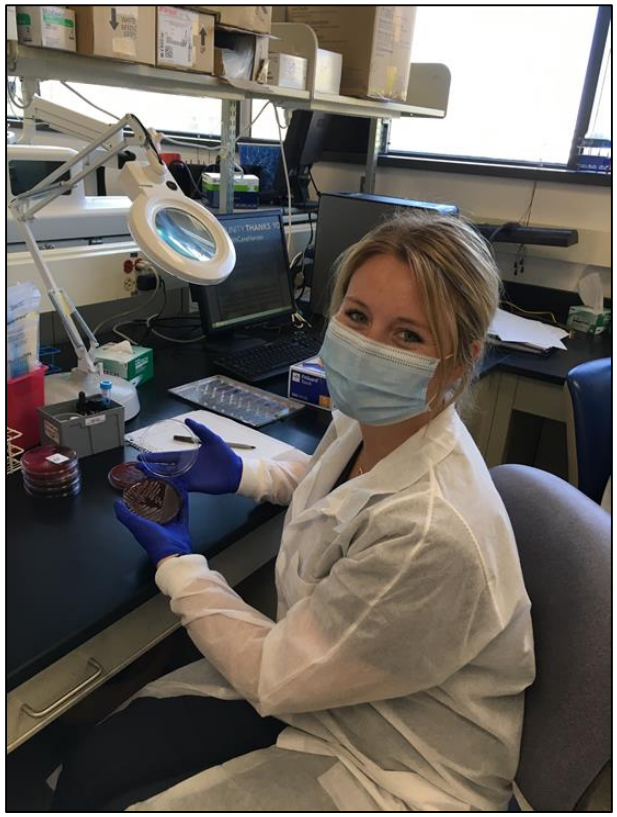
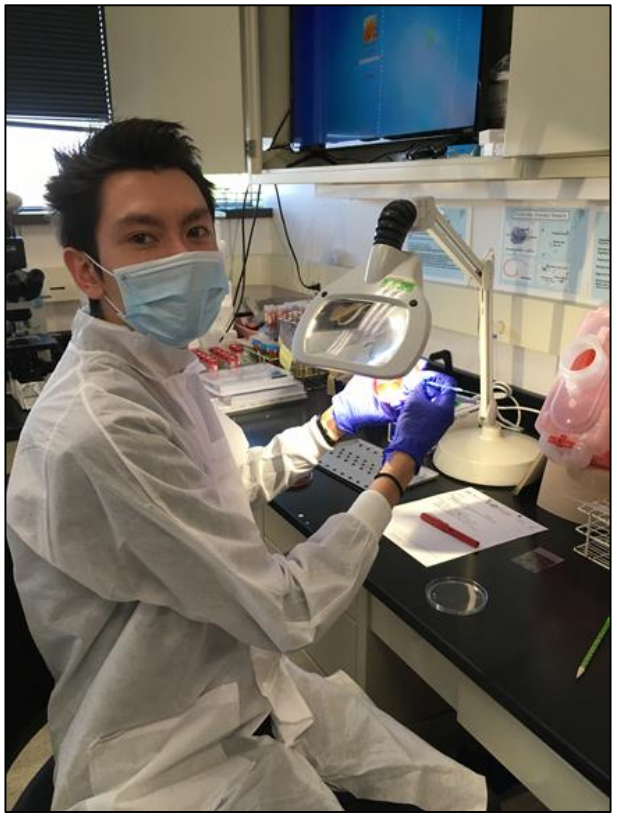
Microbiology - 2020

- Length - 6.0 Weeks
- Course Highlights
  - 5 weeks in a student bench area with clinical instructor overseeing student set-up, analysis and reporting of actual patient cultures
    - Specimen Processing, Gram stains, Antigen testing
    - Urine and stool cultures
    - Blood and CSF cultures
    - Respiratory
    - Wounds / PCR / Genitals
    - Antibiotic Susceptibilities (MICs)
    - Parasitology
  - Live didactic lectures
  - 1 week with staff technologists on live benches:
    - Blood cultures, TB, MALDI, Mycology

Microbiology – Student Lab – 4 Students

- A dedicated U-shaped bench in the clinical micro laboratory that can accommodate 4 students.





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Microbiology – Student Lab

- Students set-up and analyze live patient cultures daily.
- The clinical instructor (on left) works 1:1 with each student on reviewing the patient cultures and reporting results in the lab computer system.

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Microbiology – Student Didactic Lecture

Didactic lectures are delivered via PPT and displayed on a new computer monitor in cupboard

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Micro – Technical Bench Rotation Areas

Students also work 1:1 with a staff technologist on the following live benches:

- STAT Bench
- Anaerobes
- Mycology
- Mycobacteriology
- MALDI

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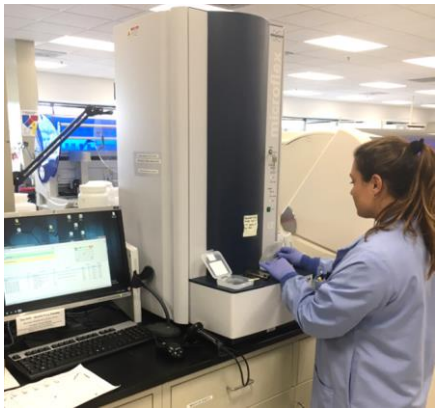
Microbiology Automation

Beckman Coulter MicroScan™

Bacterial Identification and Susceptibility Testing

Bruker MALDI-TOF™



Rapid Automated Bacterial & Fungal Identification

BD MAX™

Molecular Detection by Real-time PCR

- Group B *Streptococcus*
- Toxigenic *C. difficile*

Cepheid Infinity™

Molecular Detection by Real-time PCR

- Influenza A & B
- RSV
- *Trichomonas vaginalis*

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Molecular Pathology

Anne Prada, MB(ASCP)

Lead Technologist – Clinical Instructor

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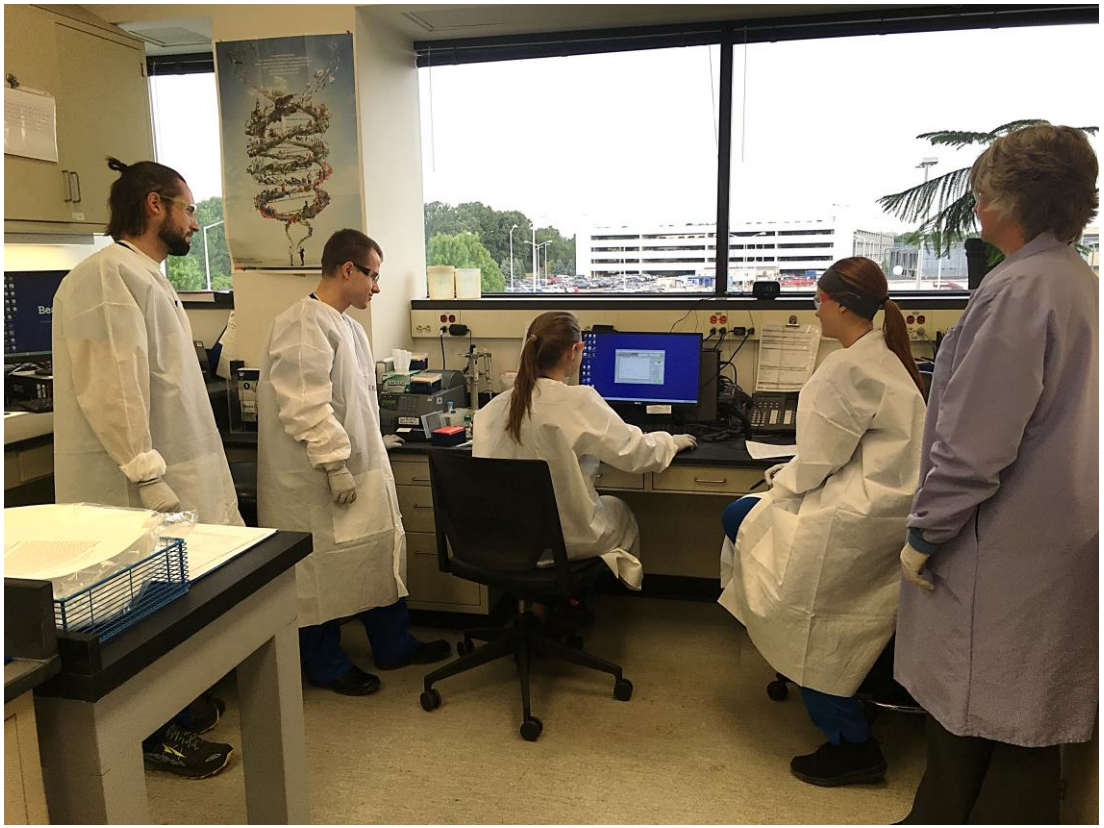
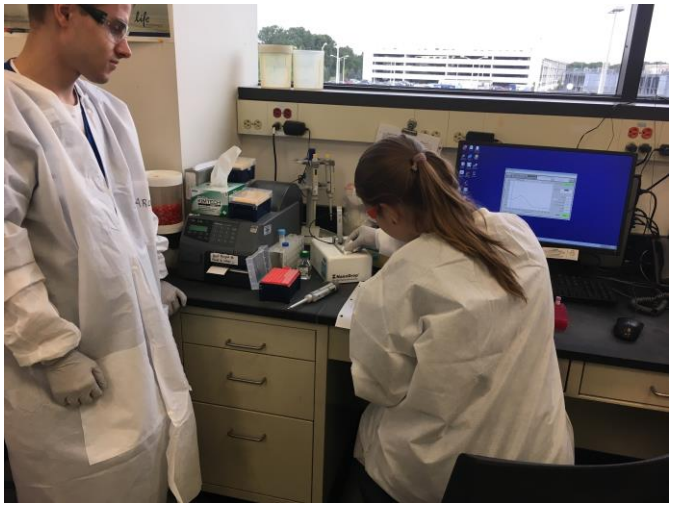
Molecular Pathology - 2020

- Length
  - 4 days
- Rotation Highlights
  - Nucleic Acid Extraction Methodologies
  - End Point PCR and qPCR Detection and Analysis
  - Hem/Onc - Solid Tumor Mutation Detection
  - Inherited Disorders Genotyping by Allelic Discrimination and Signal Amplification
  - Qualitative and Quantitative Infectious Disease Detection
  - Fragment Analysis and Sanger Sequencing
  - Immunohistology and Next Gen Sequencing Introduction
  - Cytogenetics Introduction

Molecular Pathology – Student Lab Activity

Extraction and Spectrophotometer Measurement





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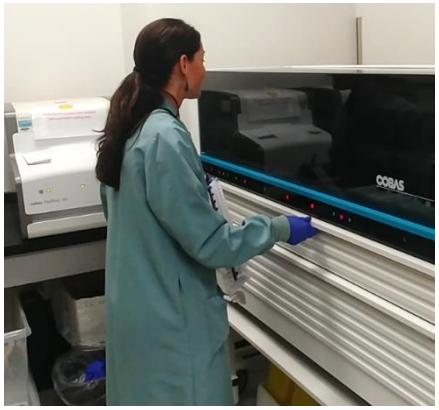
Molecular Testing Automation

BioMerieux EasyMag™

Automated Nucleic Acid Extraction

Roche COBAS AmpliPrep™

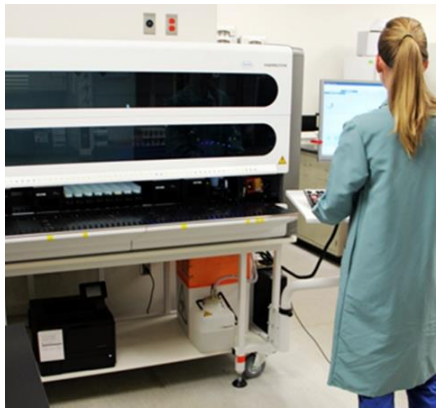


Molecular Detection by Quantitative Real-time PCR

Viral Loads:

- HIV
- HBV
- HCV
- CMV

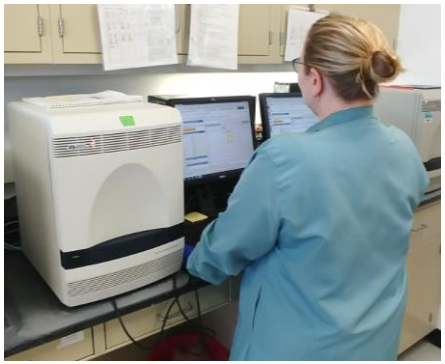
Roche 4800™



Molecular Detection by Real-time PCR

- Chlamydia trachomatis
- Neisseria gonorrhoeae
- Human Papillomavirus

Applied BioSystems 7500 FAST™



Molecular Detection by Real-time PCR

- BCR/ABL
- BRAF
- Group A *Streptococcus*
- HSV / VZV
- MLH1, MPL
- MYD88

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Special Topics

Special Topic Activities

- Laboratory Operations - Weekly Seminar
  - Education & Management topics
- Phlebotomy Rotation – 2 days
- Flow Cytometry – 2 days
- Quality Assurance – 1 day
- Professional Awareness – 1 day
- Case Study – oral PPT presentation during final week
- Performance Improvement Project – final week presentation (poster or PPT)

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Graduate Outcomes

2015-2019

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Graduation & Placement 2015-2019

Graduation*

Year	# Students	Graduation Rate
2013	12 / 12	**100%**
2014	11 / 12	**92%**
2015	12 / 12	**100%**
2016	15 / 16	**94%**
2017	16 / 16	**100%**
Average		**98%**

* Students who began the final half of the program and went on to successfully graduate from the program

NAACLS Benchmark = 70% over 3 consecutive years

Placement**

Year	# Students	Placement Rate
2013	12 / 12	**100%**
2014	11 / 11	**100%**
2015	12 / 12	**100%**
2016	15 / 15	**100%**
2017	16 / 16	**100%**
Average		**100%**

** Graduates who either found employment in the field (for those who seek employment) or who continued their education within one year of graduation

NAACLS Benchmark = 70% over 3 consecutive years

ASCP BOC Certification Outcomes 2015-2019

ASCP Board of Certification MLS Exam
% Pass 1st Time Examinees in NAACLS Programs

Source: ASCP BOC Annual Program Performance Report Summary

Exam Year and # Students Pass	Beaumont Program	Hospital	National ★
2015 13/13	100	89	78
2016 13/15	87	91	80
2017 12/13	92	91	79.6
2018 14/15	93	92	79.3
2019 15/18	83	90	81.5
Average	91.0	90.6	79.7

*** graduates who took the ASCP BOC exam within one year of graduation; first attempt

★ all NAACLS programs (hospital-based and university-based)

 # NAACLS Benchmark = 75% or better over 3 consecutive years

Beaumont data by year exam taken; may not reflect specific June and December graduating class outcomes.

Special Note:

- **NAACLS Compliance Benchmark:**
  - **BOC Pass Rate:**
  - Three year rolling average of **75%** for MLS exam taken within first year of graduation.

- **BEAUMONT Pass Rate:**
  - 5-year average (2015-2019) = **91.0 %**

Beaumont, Royal Oak

Campus Highlights

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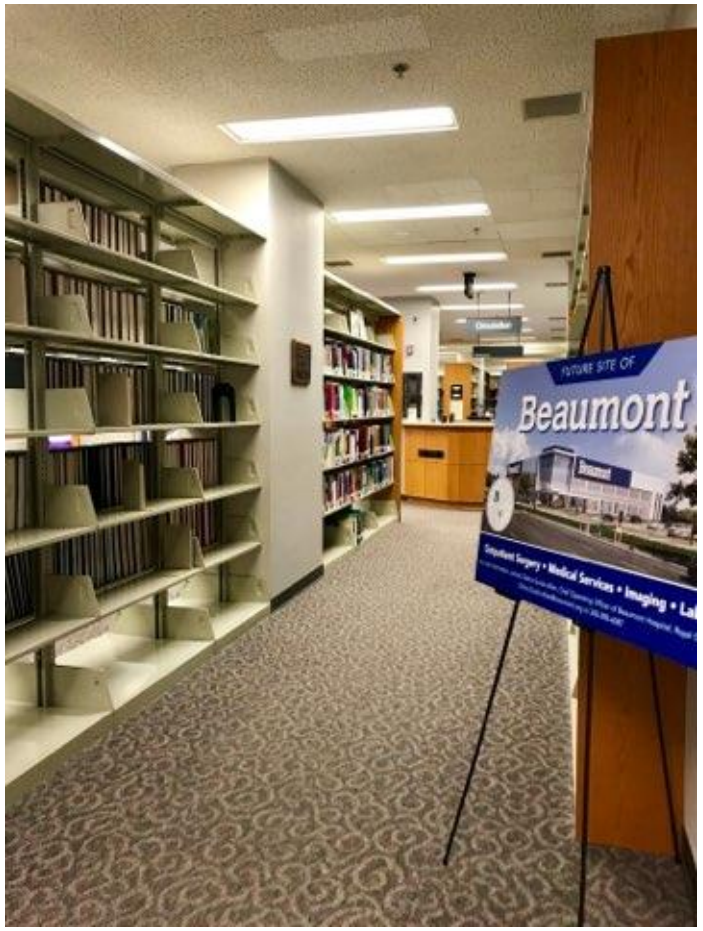
Medical Library

- Provides computer workstations, a large study area and print collection.
- The E-Library connects to over 7000 e-journals and 2000 e-books available for all affiliated users to access on campus and remotely.
- Library staff are available to provide resources and search services to the entire Beaumont Health system.



Dining Options

Starbucks

The Concourse Cafe

Mackinac Dining Room

The Baker's Deli

Papa Joe's Gourmet Market

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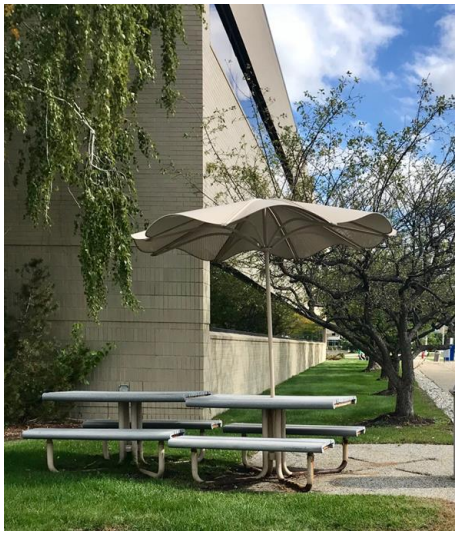
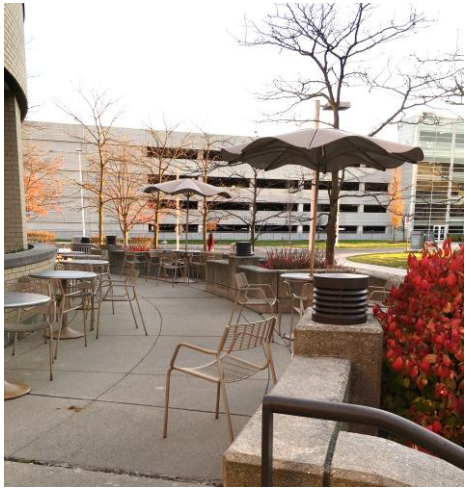
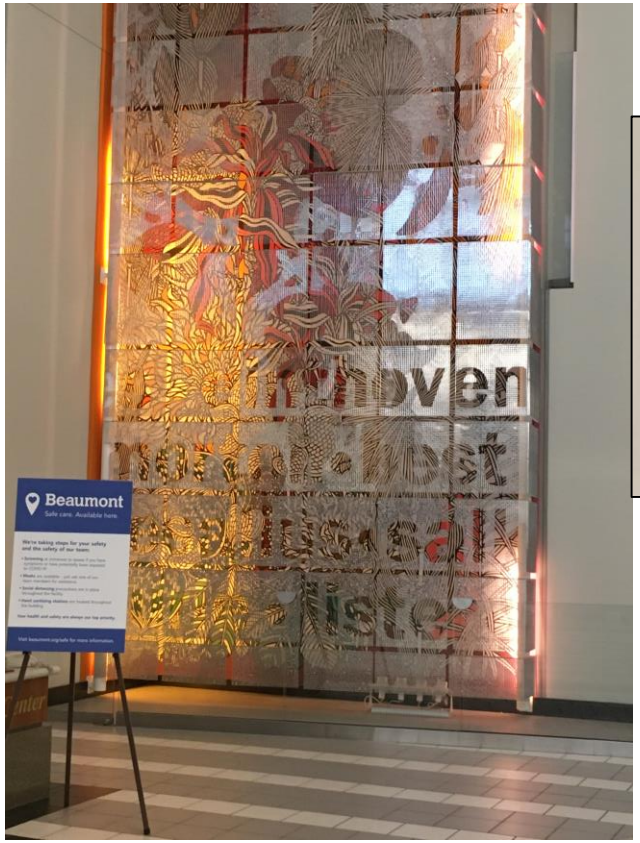
Campus Outdoor Areas





Quiet Spaces

Inspirational Artwork (provided by local artists)



Nearby Retail & Medical

Applicant FAQ's -

Answers provided by current students and staff technologists (graduates)

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Questions to Current Students

- How similar is the internship's clinical work to a university lab?

"Beaumont's clinical internship offers a more hands on clinical experience than in a university lab. In this clinical internship you are able to take the theory you learned at a university and apply it first hand in the lab. You are given more time at a specific bench within a rotation to fully understand the test principles and procedures. In a university lab you are only given an hour or so to complete your work and move on to the next topic. Procedures performed at Beaumont during the rotation are the most current testing methods. While working one on one with a technologist they give you pointers on how to better your laboratory skills such as pipetting to improve accuracy in the lab. Beaumont also offers hands on with laboratory instrumentation and troubleshoot with the instrumentation."

-Alaina Nido (OU), December 2020 MLS Student

Questions to Current Students

- How do you manage your time? What other tools do you use to help you throughout the program?

"Time management is imperative to be successful in this program, so you need to be diligent on how you spend your time both during working hours and at home. Most of your working day is spent on the bench or working with your instructor. If you find free time during the day, use it wisely! Time management techniques and tools will vary person to person, depending on what works best for them. I like to use the Pomodoro technique, which is 25 minutes of studying followed by 5 minute breaks. I also think it's important to solely be studying when you are setting aside time to work. For example, for me having Netflix on in the background is very distracting. This allows you to be more efficient with your time, and be able to enjoy free time guilt-free! There are a lot of assignments to stay on top of over the course of the entire program, and those deadlines can sneak up on you. Even if you don't have anything due the next day in your rotation, working ahead on other program tasks will lighten the load of work significantly."

-Sarah LewAllen, MS (MTU), December 2020 MLS Student

Questions to Current Students

- How different was the clinical internship from school labs?

"I felt that the biggest difference was that there is slightly more pressure here than what I felt at Oakland University, which I believe stems from the fact that these are real patient samples that we are observing in real time. When you are on the bench here, you are working directly under and medical laboratory scientists, and all the employees here are wonderfully helpful and welcoming! Take advantage of it and ask questions, everyone here truly wants the students to succeed. As far as preparation goes - I can't speak for other schools, but for those of you that went to OU, the laboratory and lecture courses have provided you with the skills and information required to succeed - you CAN do this!"

-Lindsay VanHorn (OU), December 2020 MLS Student

Questions to Current Students

- Any study methods that helped over others?

"I highly recommend purchasing the textbook Clinical Laboratory Science Review: A Bottom Line Approach. It is not only useful for studying for the certification exam, but it is also very helpful during the rotations when studying for exams. I also recommend finding a technique that works for you for utilizing the objectives given for the exams. Whether it be creating an outline or making flashcards, find what works best for you before starting the program so that you are prepared to study for the exams."

-Jillian Pieron (OU), December 2020 MLS Student

Questions to Staff Technologists

- Does what you're doing as an MLS meet the expectation you had as a student?

"For the most part, yes. Some of those expectations were formed during my internship, and I now work at the same facility I interned at, so those expectations have definitely been met."

I spend a lot of time in toxicology, and it's basically what I imagined being a "scientist" was like when I was a kid, which is awesome."

"For the most part, yes. Some of those expectations were formed during my internship, and I now work at the same facility I interned at, so those expectations have definitely been met. I spend a lot of time in toxicology, and it's basically what I imagined being a "scientist" was like when I was a kid, which is awesome."

Questions to Staff Technologists

- Are there instances where a lot of the automation systems break down?

"On a serious note, yes, there are plenty of times where some part of a system becomes temporarily unusable - either something physically breaks, or QC is out for whatever reason - and we have to troubleshoot the problem. If we can't fix it ourselves - which we try to do! - then we have to call a FSE to come in. A lot of that depends on service contracts, so we have to work around the issue a lot of the time, use established downtime procedures, etc. There's not much that we don't have an established procedure for."

Questions to Staff Technologists

- Do trainees have the chance to work night shift to learn maintenance?

“I'm not sure why incoming students seem to think maintenance is only performed on night shift - I used to think that as well for some reason - but yes, you absolutely will have the opportunity to learn instrument maintenance. In chemistry, most of our line/instrument maintenance is performed on AM shift since they have more staff. We train new hires on dayshift for several weeks before sending them to whatever shift they hired in for, so you'll be pretty well rounded as far as troubleshooting and maintenance goes. We'll make sure you feel comfortable with the instruments before we let you use them on your own!”

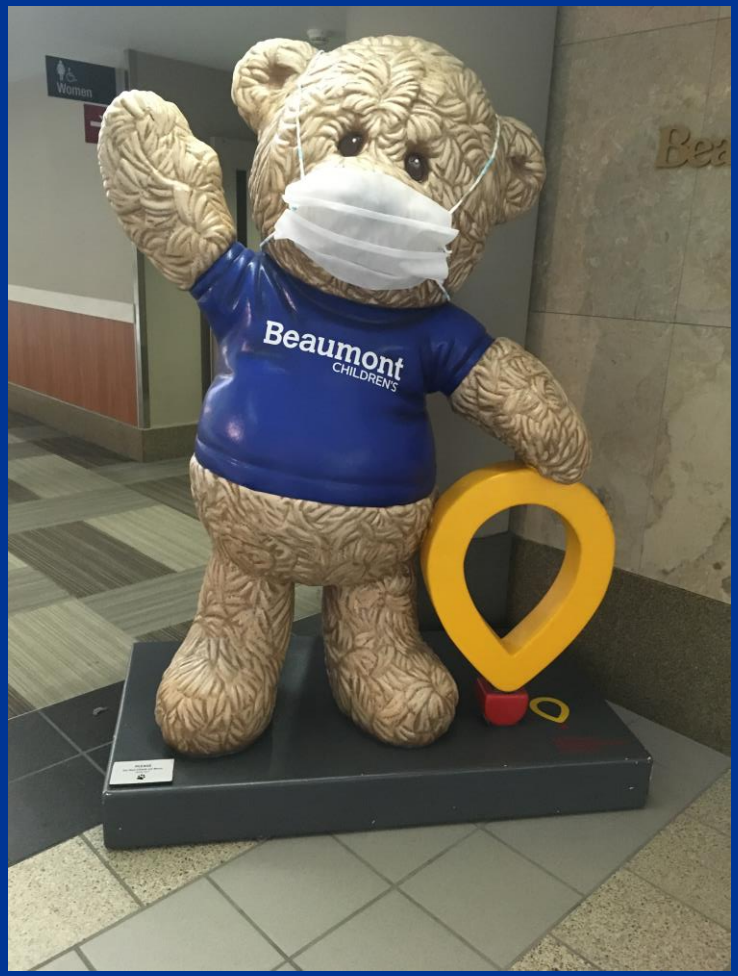
Questions to Staff Technologists

- What do you like and dislike about working in a Beaumont Laboratory?

“The campus is great. The complexity and variety of patient samples keep things interesting. The variety of shifts makes the lab accommodating for changes to your life (marriage, children, etc.). Sometimes Royal Oak feels a bit too big, but there are other hospitals in the system that have the smaller feel.”

“The best part of the job is when you can make a difference in a patient's care. Despite being "behind the scenes", we still have plenty of opportunities to make a positive difference in someone's care, and those moments really make all the schooling and studying worth it. It's a little cliché, but it's true.”

Thank you for viewing this presentation.
Stay Safe - Be Well!



Beaumont