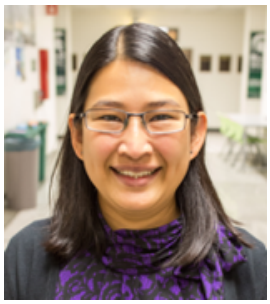
ASCLS The American Society for Clinical Laboratory Science

NEWSLINKS

JANUARY/FEBRUARY 2022 AMERICAN SOCIETY FOR CLINICAL LABORATORY SCIENCE - MICHIGAN VOLUME 34, NUMBER 1



President's Message

Mariane Wolfe

Happy New Year!

As we navigate challenges and opportunities in 2022, I am excited to continue to be a part of ASCLS. There are many reasons to be proud as a member of ASCLS: to be a part of a network across the country; to have a voice in healthcare through our advocacy work, to grow as an individual through our education offerings.

The pandemic has certainly changed many aspects of our daily lives. As we continue to move forward in 2022, I am thankful that I have a network who can help me to navigate these changes both personally through the friendships that I have gained in ASCLS, and professionally through the work that I have been involved in ASCLS.

A few opportunities to note in the near future (ASCLS Links on next page):

- January 12-17: PRISM - Pride Respect Inclusion Support Momentum. This event is brought to you by the Diversity Advocacy Council. The focus will be on understanding how uncomfortable conversations can be educational, productive and inspiring.
- January 14-15: Emerging Lab Managers Collaborative Conference (ELMC2)
- April 10-13: ASCLS-MI Spring Conference in Kalamazoo

As we move forward in 2022, THANK YOU for all the continued work that you are doing to be a part of the laboratory profession contributing to patient care. I hope you have a good and successful 2022. I also hope to see you in the near future in person or virtually!

PRISM
Pride · Respect · Inclusion · Support · Momentum

Inside This Edition:

Save the Date!

Mark your calendars for these important 2022 events

- **January 12-17: Pride-Respect-Inclusion-Support-Momentum (PRISM)**
  https://ascls.org/prism/
- **January 14-15: Emerging Lab Managers Collaborative Conference (ELMC2)**
  https://ascls.org/elmc2/
- **April 10-13: ASCLS-MI Spring Conference**
- **ASCLS National Meeting, June 26-30 in Grand Rapids, Michigan**
  https://ascls.org/annual-meeting/

American Society for Clinical Laboratory Science Michigan

ASCLS-Michigan *Newslinks*

A bi-monthly publication of the American Society for Clinical Laboratory Science - Michigan. Deadlines for articles are the 20th of Feb, Apr, Jun, Aug, Oct, & Dec. Articles must have name of author. Anonymous letters will not be published. The editor reserves the right to edit all materials submitted for publication. Articles appearing in *Newslinks* represent the opinion of the author and may not represent the opinion of the society.

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ASCLS-MI Leadership: Visit our web site at **www.ascls-michigan.org** for a complete listing and contact information for all ASCLS-MI board members and a wealth of other information on the Society.

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Clinical Laboratory Science

A focus on what is happening in our profession

Featuring articles from Scientific Assembly Chairs or Board Members.
Materials from all members are also welcomed. Submit to editor. See page 2 for details.

Clinical Metagenomics in the Microbiology Laboratory

Shicheng Chen, Ph.D., Scientific Assembly Member

After watching the documentary "*The Inventor: Out for Blood in Silicon Valley*", you may be wondering if it is realistic to expect that one drop of blood will detect numerous diseases. If not very soon, what will be the next revolution of disease diagnosis in the clinical microbiology lab?

https://www.hbo.com/documentaries/the-inventor-out-for-blood-in-silicon-valley

The truth is that more and more clinical microbiology or molecular laboratories still aim to obtain molecular measurements from clinical specimens. The collapse of Theranos in Silicon Valley has not stopped medical labs from exploring the possibilities for performing disease diagnosis with a small piece of tissue or even a single cell. One of the most plausible techniques called "omics" stands out and may be the next one that will be applied to clinical settings. Actually, some attempts have been done to obtain a snapshot of the underlying diseases that have never been understood before. You may hear about proteomics, transcriptomics, genomics, metabolomics, lipidomics, and epigenomics. These omics refer to performing global analyses in clinical specimens at the molecular levels. DNA, RNA, proteins, metabolites, and lipids can be extracted from the clinical specimen and applied for omics analysis.

To perform the conventional testing for pathogens in clinical samples, most microbiology laboratories utilize culture, biochemical phenotype testing, matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-ToF), serological testing as well as some kinds of nucleic acid testing such as PCR and hybridization. Particularly, successful utilization of real-time PCR and multiplexed PCR testing using syndromic panels significantly decrease the turnaround time, lowers the costs and increases the diagnosis accuracy. However, these directed assays greatly rely on the known pathogens and databases and are only limited to the detection of the most common causative agents for defined clinical syndromes (e.g. meningitis and encephalitis, acute respiratory infection, blood infection, sexually transmitted

diseases, and gastrointestinal diseases). Unfortunately, physicians are often baffled by the unknown or novel pathogens that can cause similar clinical symptoms.

Metagenomic next-generation sequencing (mNGS, A.K.A. shotgun metagenomic sequencing), is recently developed but is being quickly utilized as an indispensable tool to offer the comprehensive analysis of both pathogen and patient genomes [1]. mNGS applies advanced sequencing technologies (next-generation sequencing) to measure microbial and human genetic materials in human samples [2]. Thus, mNGS offers an unbiased hypothesis-free diagnostic strategy, which has many advantages over traditional molecular and microbial technologies [3]. These advantages include:

- In one clinical specimen, it allows catching a broad range of causative agents including bacteria, viruses, fungi, and parasites, without prior knowledge of any specific pathogens [2].
- mNGS can provide additional information such as the microbiome in the clinical sites; it is critical for polymicrobial infections and unusual or fastidious organisms [2].
- Moreover, this broad determination is extremely important for the characterization of the causative agents in immunocompromised patients because the profiles of commensal microbes are difficult to be recognized using culture-based methods or conventional panels [4].
- Benefits for mNGS can be revealed by providing not only a comprehensive profile for pathogens but also quantitative results [4].
- mNGS allows monitoring the disease trajectory as well as evaluating treatment efficacy over the infection course [5].
- mNGS readings cover large genomic regions (if not whole genome sequences), which are much beyond the limited marker genes (used for designing the primers for real-time PCR). Thus, mNGS may give the taxonomic classification at the strain level [4].

The procedures for specimen collection, handling, and nucleic acid isolation for a typical mNGS workflow are very similar to those in the conventional molecular diagnostic methods [2]. The clinical specimen well accepted for mNGS can be any material containing nucleic acids in various body sites. Blood, body fluids, stool, cerebrospinal fluid (CSF), urine, and nasopharyngeal swabs are the most common ones [2]. Similar to conventional diagnosis, good practice for collection using the sterile handling technique of the sample is necessary for preventing contamination sequences found in mNGS [6]. The isolation of nucleic acids (either DNA or RNA) from the samples collected is accomplished by a commercial extraction kit [6]. Selecting an extraction strategy of only RNA versus only DNA is encouraged if there is a strong suspicion of the desired pathogen's genetic composition (e.g. RNA vs DNA viruses), which may eliminate the need for unnecessary tests [2]. However, mNGS is involved in DNA library preparation. To increase the diagnostic specificity and sensitivity, target enrichment procedures are developed to minimize the reading backgrounds (unwanted information) [7]. The sequencing platform is based on the laboratory's sequencing volumes, personal experience, and skill level for operators [7]. The Illumina MiSeq system is known to be one of the most commonly used platforms for infectious disease diagnosis and pathogen surveillance. With technology advancements, the MinION may be another positive addition for medical laboratories, in particular those with limited resources. The most challenging part for mNGS may come from the bioinformatic analysis because appropriate computational resources are still required for data analysis and interpretation [7]. After removing the DNA sequences from the host or contaminated sources, contigs of long DNA readings will be assembled and aligned to a reference database for taxonomic classification [4].

However, it should be noted that mNGS is still in its early stage with certain limitations [2]. Detection methods (PCR amplification or mNGS) based on nucleic acid sequences cannot directly link an identified microorganism(s) with a specific illness [4]. For instance, when transient bacteremia is found in blood/plasma mNGS testing, such lab discoveries need to be reported out or not? Particularly, if an atypical or novel causative agent is found in clinical samples, it may have to be confirmed by alternative methods including culture, discoveries in biopsy samples, or serological studies to ascertain its true pathogenic potential; more importantly, it should be carefully interpreted in the clinical context [2]. Despite that, mNGS provides the resistome analysis (antimicrobial resistance gene profiles), genotypic testing may still need to be correlated with the phenotypical discoveries.

Currently, some laboratories have been certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA '88) and started to

provide diagnostic NGS analyses on clinical samples including oncological testing or detection of cystic fibrosis [2, 4, 6]. Procedures and guidelines for specimen collection, nucleic acid extraction, library construction, sequencing and data analyses will be expected to be standardized and cleared by FDA. With further reduced turnaround time as well as cost reductions, mNGS will emerge as a routine, mainstream diagnostic method in medical labs.

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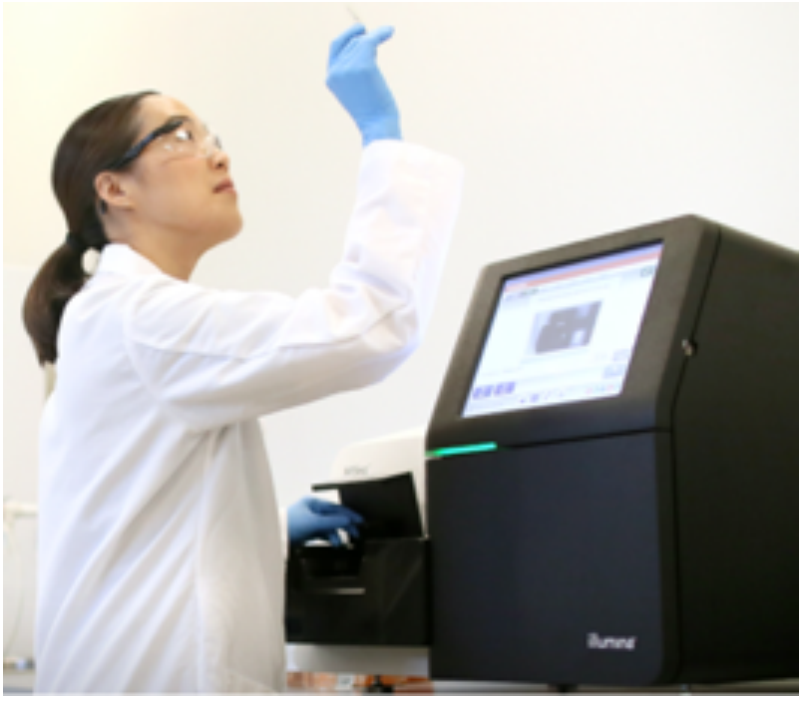

https://www.illumina.com/systems/sequencing-platforms/miseq.html

ASCLS-Michigan Call for Nominations!

Stephanie Mabry, MS, MLS(ASCP)^{CM}SC^{CM}
ASCLS-MI Nominations Committee Chair

Have you thought about becoming more involved with ASCLS-MI, but you aren't sure how? Do you want to develop your leadership skills, be able to network closely with other ASCLS-MI members, or make an impact on your profession? Or maybe you know someone that has always wanted to be more involved? Consider running or nominating someone for an elected position for ASCLS Michigan's Board of Directors!

The ASCLS-Michigan Nominations Committee is seeking qualified members interested in serving in elected leadership positions with a term of office beginning Summer 2022. Voting for these elected positions will occur electronically this upcoming spring. Being able to both vote for and be considered as a candidate for these positions is one of the many benefits and responsibilities of belonging to a grassroots organization, and we hope you will consider self-nominating (or nominating a colleague) for one of the following elected positions:

PRESIDENT ELECT
Term of Office: Three years (One as President Elect, one as President, and one as Past President)
Eligibility: Active or Emeritus member of the Society for five (5) years and have served as an officer, director or Standing Committee chair within the five-year period.
Position Description of Duties as President: ASCLSMI-PD-0001 President.docx (sharepoint.com)

SECRETARY
Term of Office: One year
Eligibility: Professional or Emeritus member of the Society for at least two (2) years at time of taking office.
Position Description: ASCLSMI-PD-0004 Secretary.docx (sharepoint.com)

ASCENDING PROFESSIONAL DIRECTOR
Term of Office: One year
Eligibility: Individuals with Ascending Professional membership status at time of taking office.
Position Description: ASCLSMI-PD-0007 Ascending Professionals Director.docx (sharepoint.com)

DISTRICT DIRECTOR (Nine positions open)
Term of Office: One year
Eligibility: Professional or Emeritus member of the Society for at least two (2) years at time of taking office.
Position Description: ASCLSMI-PD-0008 District Director.docx (sharepoint.com)

GOVERNMENT AFFAIRS COMMITTEE
Term of Office: Two years (One as Chair-Elect and one as Chair)
Eligibility: Professional or Emeritus member of the Society for at least two (2) years at time of taking office.
Position Description of Duties as Chair: ASCLSMI-PD-0009 Government Affairs Chair.docx (sharepoint.com)

ASCLS-Michigan BOD Meeting in early 2020 (pre-pandemic).

NOMINATIONS COMMITTEE (Two positions open)

Term of Office: Two years
Eligibility: Professional or Emeritus member of the Society for at least two (2) years at time of taking office.
Position Description of Chair: ASCLSMI-PD-0011 Nominations Committee Chair.docx (sharepoint.com)

DELEGATE TO JOINT ANNUAL MEETING (Multiple positions open)

Term of Office: 1 year
Eligibility: Developing, Ascending, Professional, or Emeritus members of the Society
Additional Information: Each constituent society has four automatic delegates (President, President-Elect, a Developing Professional, and an Ascending Professional), and is awarded additional elected delegates based on professional, ascending, and emeritus membership counts as of April 30. Michigan typically has 4 elected delegates. The role of delegates is to attend governance sessions (listed below) and vote on issues that arise at the Joint Annual Meeting (JAM), including the election of national officers; approving, repealing or updating position papers; and/or addressing policy and bylaws concerns. In return for their service, ASCLS-Michigan will reimburse automatic delegates early registration and certain travel costs up to an amount based on budget when set the previous year, and will reimburse elected delegates their registration cost, at early registration rates. The term of service is one year, and delegates may be called upon to attend one or more interim House of Delegates (HOD) meetings (often one is scheduled in January) to provide guidance on issues that arise throughout the course of the membership year as well. ASCLS-Michigan Delegates are free to vote their preference on resolutions, amendments, and candidates for national office following careful review and deliberation of the material presented in the reference committees and any applicable caucuses. They should also follow as closely as possible the recommendations of the membership of ASCLS-Michigan.

Required Activities: Delegates are required to attend the following Governance Sessions. Additional information for the Joint Annual Meeting can be found at https://www.ascls.org/education-meetings/annual-meeting. The schedule of these events will be posted as it becomes available.

- ASCLS Region IV Caucus
- ASCLS Meet the Candidates for Board of Directors
- ASCLS Election of Directors and Officers
- ASCLS Annual House of Delegates
- Other meetings/events as determined by the ASCLS-Michigan Delegate Chair

•*Delegates also must submit a Request for Reimbursement form according to Society policy and timelines. This form will be emailed to all delegates during the Joint Annual Meeting. Failure to comply with Delegate responsibilities will cause the Delegate to be ineligible for reimbursement.*

If you are interested in becoming involved in ASCLS-Michigan Leadership by running for one of these open positions, please email a completed Nomination Form to ASCLS-Michigan Nominations Chair Stephanie Mabry at Stephanie.Mabry@outlook.com. Please also reach out to any of our Nominations Committee Members you may know (Alicia Kuzia, Sandy Cook, or Sharon Ziemba) if you have questions or are interested in serving ASCLS-Michigan in alternate ways.

Thank you for your consideration, and wishing you all the best as we look forward to 2022!

Delegates from Michigan, Ohio, Indiana, and Kentucky at the 2017 national meeting.

American Society for Clinical Laboratory Science

ASCLS MICHIGAN

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