American Society for Microbiology
Distinguished Lecturer (ASMDL) Program

Program Year 2018-2019
Lecture Topics and Descriptions

The ASMDL Roster includes two Waksman Foundation Lecturers, supported through funding from the Waksman Foundation for Microbiology, with research topics primarily focused in antibiotics, translational research and/or environmental microbiology. Waksman Foundation Lecturers are clearly denoted on the Roster.

Aaron A. Best, Ph.D. (term: 7/1/18 through 6/30/20)
Waksman Foundation Lecturer

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ASM MEMBERSHIP AFFILIATION
Primary Division W Microbiology Education
Secondary Division R Evolutionary and Genomic Microbiology

LECTURE TOPICS AND DESCRIPTIONS – Aaron A. Best, Ph.D.

Just Your Friendly, Neighborhood *E. coli?* Population Diversity of *Escherichia* Isolated from Fresh Water Sources
*Escherichia coli* is traditionally thought of as a commensal and pathogen of animals and as a primary model organism for the study of molecular biology, genetics and microbiology. It is also used as a fecal indicator bacterium in the monitoring of food and water quality. However, increasing evidence suggests that there are strains adapted to secondary environments outside of host organisms, including soil and water, raising the question of whether *E. coli* should continue to be used in routine water quality monitoring. This talk describes an ongoing research project conducted in the context of a course-based undergraduate research experience (CURE) to understand the types of *E. coli* isolated from fresh water sources and their genomic and phenotypic diversity.

Reaching Clarity: Monitoring a Hypereutrophic Watershed During Remediation
The Macatawa Watershed in West Michigan contains a drowned river mouth lake that drains into Lake Michigan. Extensive anthropological influence has resulted in hypereutrophy of Lake Macatawa characterized by extreme levels of sediment, nutrient loading of phosphorous and
nitrate, and levels of *E. coli* that exceed contact limits. This talk describes a partnership of Hope College with the local community to actively monitor remediation of the watershed for impact on physical and microbial levels. Weekly sampling of water at lake and stream sites is conducted by undergraduate research students in the context of a course-based undergraduate research experience (CURE) to establish baseline levels of sediment, phosphate, nitrate, *E. coli*, and 16S rRNA bacterial community profiles for long term comparison as remediation efforts continue.

**What’s in Your Water? Assessing Water Quality Around the World**
The WHO estimates that, in 2015, 844 million people lacked access to an improved water supply, and that at least 2 billion people used a drinking water source that had fecal contamination. Annually, it is estimated that over 840,000 people die of diarrhea related to the use of contaminated water supplies, including over 300,000 children. These deaths are largely preventable with proper drinking water improvement and education. This talk describes a global survey of unimproved drinking water sources from over 20 countries using 0.1 micron point-of-use filters to collect water quality metrics, including profiles of 1) microbial populations based on 16S rRNA sequencing, 2) dissolved heavy metals, and 3) particulate geochemistry. Bacterial community profiles are analyzed for connections to chemical and particulate profiles, geographic location, drinking water source and other factors. In addition, the health impacts of introducing point-of-use water filters in all households of villages in relation to water quality metrics is described.

**Taking the Research Plunge from Day 1: Authentic Research for First Year Undergraduates**
Incorporation of authentic research experiences into undergraduate training has been shown to impact recruitment and retention of students into STEM fields. Over the past 20 years, efforts to include research in course-based experiences have increased, yielding many small-scale efforts at individual institutions and several examples of nation-wide programs that span many institutions. This talk describes Hope College’s experience with the implementation of both local and national course-based undergraduate research experiences (CUREs), including the SEA-PHAGES program. The Day1 Watershed Research Community at Hope College (https://hope.edu/academics/day1/watershed.html) expands the concept of a CURE to include residential and academic support communities for students. The impacts of the programs on student careers, student learning, and student perceptions of themselves and science is being assessed and is described. Lessons learned from implementation and participation in a variety of CUREs will be described such that graduate students, post-doctoral students and faculty can envision implementation of these approaches at their own institutions.

**BIOGRAPHICAL SKETCH – Aaron A. Best, Ph.D.**
My first exposure to microbiology was during undergraduate training at William Jewell College (Liberty, MO), a small private liberal arts college (B.A. Biology, 1996). An undergraduate research experience led me to obtain a Ph.D. in Microbiology from the University of Illinois, Urbana-Champaign with Dr. Gary Olsen (2001) focused on evolution of transcription systems, followed by a post-doc with Dr. Carl Woese in molecular evolution. I pursued a career in academia that supported serious research and excellence in teaching, returning to a liberal arts environment where I am the Harrison C. and Mary L. Visscher Professor of Genetics at Hope College. I maintain an extramurally funded research program, incorporating undergraduates into all aspects of the research process; have combined research and teaching programs into a single
endeavor; have taught and participated at a programmatic level in HHMI’s SEA-PHAGES for nine years; incorporated research projects into a microbiology laboratory course; and started a laboratory course for first-year students on the microbial ecology of our watershed. My research centers on comparative genomics of environmentally derived *Escherichia* populations, molecular ecology of fresh water systems, integration of large-scale datasets into genome-scale metabolic models of bacteria, and assessment of integrating research into teaching on student education.

CV is available by request from adempsey@asmusa.org at ASM Headquarters

**LECTURER’S PERSONAL STATEMENT – Aaron A. Best, Ph.D.**
The ASMDL program represents an opportunity for me to give back to the Society that profoundly influenced my professional development. I have established a highly active research program in the context of undergraduate training at a primarily undergraduate institution (PUI), and I believe that my expertise in combining research with intense teaching responsibilities can serve as a positive example for others considering careers in academic microbiology. It is well documented that less than 10% of Ph.D.’s will obtain tenure track positions at research intensive universities; it is imperative that examples of “alternative” career paths are made clear. My first ASM meeting was in Chicago during graduate school, and I have been attending the General Meeting/ASM Microbe since then. As I transitioned to a PUI, I began attending the ASM Conference for Undergraduate Educators (CUE), which has proven to be an invaluable resource. I had the privilege of co-organizing ASMCUE in 2007. My undergraduate research students have presented work at national ASM meetings; two have received ASM Undergraduate Research Fellowship (URF) awards. In 2014, I presented at an ASM General Meeting workshop, “Getting Started as a Microbiologist at a Primarily Undergraduate Institution,” and I have presented invited talks at the General Meeting and the Michigan Branch meetings. During my time at Hope College, I have published 24 peer reviewed papers; 16 include over 100 undergraduate co-authors. ASM is vital to my professional development. I look forward to serving the Society by bringing the perspective of an active teacher/scholar at a PUI to the ASMDL program.
Stephen M. Beverley (term: 7/1/18 through 6/30/20)

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ASM MEMBERSHIP AFFILIATION
Primary Division AA Free-Living, Symbiotic, & Parasitic Protists
Secondary Division B Microbial Pathogens

LECTURE TOPICS AND DESCRIPTIONS – Stephen M. Beverley

Role of RNA Viruses as Pathogenicity Factors in Protozoan Parasites
Many protozoans contain endogenous viruses; examples include *Leishmania*, *Trichomonas*, *Giardia*, and several apicomplexans including *Cryptosporidium*, *Babesia*, and *Toxoplasma*. Focusing mostly on *Leishmania*, we showed a few years ago that these actually contribute towards parasite virulence in animal models and probably in humans. As endobiont viruses, these in effect constitute the “virome within.” Lecture topics would include the emerging parasite viromes including viral discovery, the structure and functional relationships of viruses within the parasite host, how these contribute to mammalian pathogenicity, and exploiting these viruses as therapeutic targets. *Leishmania* will be the central paradigm but studies of the other protozoal viruses will be incorporated depending on the specific lecture.

The Role of *Leishmania* Surface Glycoconjugates in Pathogenicity
Like many pathogens, *Leishmania* is covered with a dense glycocalyx that plays critical roles in survival through the parasite’s infectious cycle. To probe the role of these we have employed forward and reverse genetic methods, steadily incorporating the most recent advances in genetic tools now including CRISPR/Cas9, which works with high efficiency. We are systematically dissecting the pathways for every surface glycoconjugate, starting from the synthesis of fundamental sugar or lipid building blocks on up, and using genetics to then link these to the consequences on parasite virulence. Unexpectedly, one of the new glycosyltransferases is localized to the parasite mitochondrion, where its activity and residence is essential. Previously, glycosylation was not thought to occur in mitochondria and this may represent an unexpected new direction for eukaryotes generally. This story and its role in metabolism is an intense area of investigation.

Genomic and Genetic Perspectives on Parasite Virulence
With a consortium of investigators we now have genome sequences for many *Leishmania* species; comparative analyses and implications for virulence are a focus.
Widespread Aneuploidy in *Leishmania*

Cultured *Leishmania* parasites typically show aneuploidy at 1-10 chromosomes, a remarkable finding seen in several fungal species as well. These provide a mechanism and opportunities for selection and adaption, especially given the low frequency of genetic exchange and transcriptional regulation in *Leishmania*. Recent studies have raised the question of whether this phenomenon is seen in nature or is an adaptation to laboratory culture, which we are now addressing through direct examination of uncultured parasites by methods including single-cell sequencing.

**BIOGRAPHICAL SKETCH – Stephen M. Beverley**

Dr. Beverley’s laboratory studies the biology of the protozoan parasite *Leishmania*, including virulence factors, host response and basic metabolic functions. His laboratory has focused on the development of genetic tools and their applications to diverse questions in *Leishmania* biology, more recently incorporating genomic and gene editing approaches. Recent foci include the study of the RNAi interference pathway as a tool and also the forces contributing to its loss during evolution in some *Leishmania* species. These studies have led his laboratory into the study of *Leishmania* RNA viruses and their role in parasite virulence. Translational interests include the identification of chemotherapeutic targets and live vaccination strategies. Dr. Beverley earned his Ph.D. in biochemistry from the University of California, Berkeley, and did postdoctoral research at Stanford University. In 1983 he moved to Harvard Medical School and went on to become Professor and Interim Chair of the Department of Biological Chemistry & Molecular Pharmacology. In 1997 he joined the faculty at Washington University School of Medicine in St. Louis as Head of the Department of Molecular Microbiology. He is a Burroughs- Welcome Scholar in Molecular Parasitology, a member of the US National Academy of Sciences, a member of the American Academy of Microbiology, a Fellow of the AAAS, and a Fellow of the American Society of Tropical Medicine and Hygiene. In 2017, Dr. Beverley received the Peter Raven Lifetime Achievement Award from the St. Louis Academy of Sciences.

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**LECTURER’S PERSONAL STATEMENT – Stephen M. Beverley**

One of the goals of the ASMDL program is to encompass the diversity of the ASM, including unicellular eukaryotes including parasitic protozoa, as well as institutional and geographical strengths – both of which I have great enthusiasm for. I will bring to this program a perspective based not only on my own laboratory research, but also from having served as chair of a major microbiology department for more than 20 years. This includes perspective across a wide range of microbiology and other disciplines, design and implementation of teaching for undergraduates, MD and Ph.D. students, and career development for trainees and faculty. The ASMDL program provides an opportunity for increased interactions with trainees beyond that typically available in most conference or individual university seminars. Given the increasing and complex pressures they face, opportunities to talk with senior leaders (and vice versa) is perhaps more critical than ever.
Barbara A. Brown-Elliott, MS, MT(ASCP)SM (term: 7/1/18 through 6/30/20)

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ASM MEMBERSHIP AFFILIATION
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Secondary Division C Clinical Microbiology

LECTURE TOPICS AND DESCRIPTIONS – Barbara A. Brown-Elliott, MS, MT(ASCP)SM

Nontuberculous Mycobacteria (NTM) and Recent Developments in the Mycobacteriology Laboratory
Mycobacteriology (the study of mycobacteria and the diseases they cause) has been greatly impacted by recent changes in the laboratory methods used for identification of NTM, including gene sequencing, and by the need for multiple gene targets for the identification of some species, especially among the rapidly growing mycobacteria. There are currently more than 160 known species of NTM, and the use of molecular methods and matrix assisted laser deionization time of flight (MALDI–TOF) has expedited the identification of these organisms in the clinical laboratory, in contrast to the classic, but now outdated, phenotypic and biochemical methods. This talk provides an introduction to NTM and the application of new technologies in their identification.

Nocardia: Update on Taxonomy and Laboratory Diagnosis, Including Molecular Methods and Antimicrobial Susceptibility Testing
The genus Nocardia has had a long and complex history, and an equally complex taxonomy that is rapidly changing with the addition of newly described species derived by gene sequencing and other molecular methods. There are currently approximately 100 recognized species of Nocardia. Because of the increasing number of species, biochemical identification methods are no longer adequate to allow discrimination among species, and have been replaced by molecular methodologies. This talk will provide an overview of the genus Nocardia, its relevance in human disease, and the methods currently used in laboratory diagnosis and susceptibility testing.
**Mycobacterium avium Complex (MAC): Clinical Diagnosis, Laboratory Identification, and Antimicrobial Susceptibility Testing**

MAC is the most commonly encountered nontuberculous mycobacterial taxon worldwide. The complex is composed of at least eight known species with varying clinical significance. The organisms cause chronic pulmonary infections in otherwise healthy elderly or middle-aged individuals and also cause disseminated infections in HIV-infected individuals. This talk will focus on the diseases associated with MAC, and the types of tests conducted once a MAC specimen arrives in the clinical laboratory.

**Animal Infections Caused by Rapidly Growing Mycobacteria and Other Aerobic Actinomycetes**

Rapidly growing mycobacteria and other aerobic actinomycetes can cause a wide variety of infections in domestic animals including panniculitis, mastitis, and other important infections. The recognition of accurate species identification is important in the management of veterinary disease. This talk describes the types of diseases caused by these organisms in animals, and the methods used to identify the causative agent.

**Challenges in Research and How Having the Right Team Can Help**

The major challenge to effective research has been the limitation of funding for specific projects. Importantly, the selection of the right team and topics at the right time can also be instrumental to the success of the research.

**BIOGRAPHICAL SKETCH – Barbara A. Brown-Elliott, MS, MT(ASCP)SM**

Barbara Brown-Elliott is an Associate Professor of Microbiology at the University of Texas Health Science Center at Tyler where she is also supervisor of the CAP-accredited Mycobacteria/Nocardia Laboratory and Instructor of Microbiology in the Masters of Biotechnology program. Barbara received her B.Sc. from Houston Baptist University, and her M.Sc. from the University of Texas at Tyler, and is a registered medical technologist with a specialty in microbiology. Barbara has extensive expertise in the detection, identification, and antibiotic susceptibility testing of nontuberculous mycobacteria, and other aerobic actinomycetes, and has authored more than 185 scientific articles and chapters, and presented more than 125 research abstracts/posters in this field. Barbara has been on the editorial board of *Clinical Microbiology Reviews* and the *Journal of Clinical Microbiology*, and an advisor on two subcommittees of the Clinical and Laboratory Standards Institute, the Centers for Disease Control Laboratory Proficiency Testing Committee, and the American Thoracic Society Committee to revise guidelines for the diagnosis of nontuberculous mycobacteria. She is a 2009 recipient of the Gardner Middlebrook Award for significant contributions in the field of mycobacteriology, and the 2013 ASM Scherago-Rubin Award for excellence in clinical microbiology.

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LECTURER’S PERSONAL STATEMENT – Barbara A. Brown-Elliott, MS, MT(ASCP)SM

I developed my interest in microbiology in high school, and since then, I have devoted my entire career to microbiology, including teaching microbiology to students, many of whom went on to become dedicated physicians and researchers. I am always honored to share my knowledge with the next generation of microbiologists and believe that the future of microbiology is bright. It is exciting to see the passion in young scientists as they hone their skills.

As a clinical microbiologist with over 30 years of experience, and as a supervisor of a national reference laboratory, I have seen many changes in the way bacteria are studied. The fundamentals of research and diagnostics in microbiology remain the same, however, including the importance of careful observation, patience (especially with mycobacteria!), and a willingness to learn. Even after decades of research, the bugs can still surprise me!

I have been an ASM member since 1978, and every year I look forward to attending ASM meetings which keep me abreast of new developments and allow me to continually interface with students, scientists, and physicians from around the world. I also enjoy discussing my research and have presented at many ASM workshops, poster sessions, and symposia. I am particularly enthusiastic about the opportunity that the ASM Distinguished Lecturer program provides for interacting with students and postdoctoral fellows. I will bring my unique perspectives and experience as a clinical microbiologist and researcher, and hopefully along the way, groom the next distinguished lecturer awardee.
Terje Dokland  (term: 7/1/17 through 6/30/19)

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ASM MEMBERSHIP AFFILIATION  
Primary Division  M  Bacteriophage  
Secondary Division  J  Cell and Structural Biology  

LECTURE TOPICS AND DESCRIPTIONS – Terje Dokland

**Staphylococcal Pathogenicity Islands: Hijackers on the Phage Assembly Pathway**

*Staphylococcus aureus* pathogenicity islands (SaPIs) are mobilized at high frequency by specific “helper” phages. SaPIs have evolved many mechanisms to exploit their helpers for their own propagation, including the re-direction of the phage assembly pathway to produce small capsids that are unable to package complete phage genomes. We study this mobilization process using a combination of genetics, biochemistry and structural biology, especially high resolution cryo-electron microscopy.

**Pirates of the Caudovirales**

Some genomic elements are “pirates” that exploit “helper” bacteriophages for their own propagation, including the *Staphylococcus aureus* pathogenicity islands (SaPIs) and the P4-like elements of *E. coli*. These elements employ a variety of strategies to usurp the replication and assembly machinery of their helpers. This talk will touch on the evolution, mechanisms and role in bacterial virulence of these pirates.

**Taking Advantage of the Cryo-EM “Resolution Revolution” in Microbiological Research**

Cryo-electron microscopy (EM) allows the structure determination of biological structures from proteins to entire cells in their native state. Recent innovations, especially the development of direct electron detectors, now allow structures of proteins to be determined to near-atomic resolution. Examples will be given from a wide range of systems, including our own work on phage assembly.

**Scaffolding-mediated Assembly Control in the Bacteriophages**

Scaffolding proteins provide control over the assembly process in bacteriophages and many other viruses. Analysis of scaffolding proteins from various bacteriophages provides insights into how these proteins act to control capsid assembly.
**BIOGRAPHICAL SKETCH – Terje Dokland**

My research over the past 25 years has focused on the structural biology of viral and prokaryotic pathogens, starting with my Ph.D. work on cryo-electron microscopy of bacteriophages at the European Molecular Biology Laboratory, through my postdoctoral work on crystallography of bacteriophage phiX174 and Norwalk virus in Dr. Rossmann’s lab at Purdue, to my subsequent years as an independent researcher in Singapore and at the University of Alabama at Birmingham (UAB). I have continued to publish extensively in this area, including crystallography and cryo-EM studies of eukaryotic viruses (PRRSV, West Nile virus, HIV, mumps), bacteriophages (P2/P4 and *Staphylococcus aureus* phage 80alpha), bacteria (*Bacillus anthracis*) and exosomes.

My main research focus over the past few years has been on the phage-induced mobilization of *S. aureus* pathogenicity islands (SaPIs). Genetic mobilization is a critical process in the evolution of virulence and antibiotic resistance in *S. aureus*, and phages play a key role in this process. We study this process by a hybrid approach that includes genetics, biochemistry, cryo-EM and NMR spectroscopy. These studies have revealed novel mechanisms of capsid assembly and size determination, phage-induced derepression, SaPI interference with phage multiplication, and DNA packaging by phages and SaPIs.

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**LECTURER’S PERSONAL STATEMENT – Terje Dokland**

While the main emphasis in the Department of Microbiology at UAB is on research, I have always remained committed to dissemination of knowledge, mentorship and training. Most of the research in my lab is carried out by graduate students, and I enjoy the process of mentoring them to successful careers in science. I was recipient of the Graduate School Dean’s Award for Excellence in Mentorship in 2011 and I am one of the most actively involved in teaching in our Department. My main research project on the mobilization of *Staphylococcus aureus* pathogenicity islands (SaPIs) straddles several fields of research, from structural biology to virus assembly to bacterial pathogenesis, allowing for the presentation of narratives that transcend these individual categories and that have been well received at numerous conferences and invited talks. Structural biology has recently been revolutionized by innovations in cryo-electron microscopy. My strong foundation in this cutting-edge methodology allows me to bring these innovations to bear on microbiology research. I hope to convey the excitement of structural biology to young investigators through narratives that are compelling to students and trainees in many areas of microbiology.
Ramon Gonzalez (term: 7/1/17 through 6/30/19)

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ASM MEMBERSHIP AFFILIATION
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Secondary Division K Microbial Physiology & Metabolism

LECTURE TOPICS AND DESCRIPTIONS – Ramon Gonzalez

Engineering an Orthogonal and Modular Pathway for the Efficient Synthesis of Functionalized Small Molecules
Anabolic metabolism can produce an array of small molecules, but yields and productivities are often limited by carbon and energy inefficiencies and slow kinetics. Catabolic and fermentative pathways, on the other hand, are carbon and energy efficient but support only a limited product range. To address these limitations, we engineered an orthogonal pathway for the synthesis of functionalized small molecules based on non-decarboxylative Claisen condensation reactions (and subsequent β-reductions) that uses functionalized primers and functionalized extender units and operates in an iterative manner. This carbon–carbon elongation mechanism was selected because of its ability to support iterative condensation reactions at high energy (ATP) efficiency, as previously demonstrated in our laboratory (Nature 476, 355-359, 2011). The orthogonality of the newly developed platform enables predictable, tunable, and programmable operation of a pathway that retains the high product diversity, modularity, and combinatorial capabilities of anabolism. Using different ω- and ω-1-functionalized primers and α-functionalized extender units in combination with various termination pathways, we engineered the synthesis of 18 products from 10 classes in Escherichia coli, including ω-phenylalkanoic, α,ω-dicarboxylic, ω-hydroxy, ω-1-oxo, ω-1-methyl, 2-methyl, 2-methyl-2-enolic and 2,3-dihydroxy acids, β-hydroxy-ω-lactones, and ω-1-methyl alcohols (Nature Biotechnology, 2016, 34 (5): doi:10.1038/nbt.3505). This talk will highlight the use of the aforementioned pathway as a platform for the synthesis of a wide range of product families (Current Opinion in Biotechnology, 42:206–215, 2016).

Rethinking the Logic of Biological Activation and Conversion of Methane: A New Era of Industrial Biomanufacturing
If methane, the main component of natural gas, can be efficiently converted to liquid fuels, world reserves of methane could satisfy demand for transportation fuels and industrial chemicals in addition to use in other sectors. However, the direct activation of strong C-H bonds in methane and conversion to desired products remains a grand challenge for both catalysis and biocatalysis.
This talk discusses opportunities to rethink the logic of biological methane activation and conversion to liquid products (Nat. Chem. Biol. 10, 331, 2014; Science 343, 621, 2014) along with how these advancements would enable a new era of biological manufacturing (Science, 355: 38, 2017). Our vision includes both a new foundation for methane bioconversion and paths to develop technologies for the production of liquid products from methane at high carbon yield, high energy efficiency and with low CO2 emissions. These technologies could support natural gas bioconversion facilities with a low capital cost and at small scales, which in turn could monetize the use of natural gas resources that are frequently flared, vented, or emitted.

Understanding and Harnessing the Anaerobic Fermentation of Glycerol
Glycerol is a 3-carbon triol generated in large amounts during production of bioethanol and biodiesel. Its abundance, low price and high degree of reduction of its carbon atoms make glycerol an advantageous feedstock for fuel and chemical production (Trends Biotechnol. 31, 20, 2013). However, because of the highly reduced nature of its carbon atoms, only a handful of organisms are able to utilize glycerol under fermentative conditions (i.e., absence of external electron acceptors), a metabolic mode essential to fully exploit the reduced nature of glycerol. A few years ago, our laboratory discovered that the bacterium E. coli can anaerobically ferment glycerol, a previously unknown metabolic capability of this organism (Appl. Environ. Microbiol. 74: 1124, 2008; Biotechnol. Bioeng. 94: 821, 2006). These findings led us to propose a new metabolic model for the fermentative utilization of glycerol in E. coli and other bacteria (Biotechnol. Bioeng. 109: 187, 2012; Appl. Environ. Microbiol. 75: 5871, 2009; Metab. Eng. 10: 234, 2008). The knowledge base created by these fundamental studies laid the foundation for the design and implementation of a new metabolic platform to efficiently convert glycerol to fuels and chemicals such as succinate, ethanol, hydrogen, formate, D- and L-lactate, and 1,2-PDO (Microb. Cell Fact. 12: 7, 2013; Biotechnol. Bioeng. 108: 867, 2011; Metab. Eng. 12: 409, 2010; Appl. Environ. Microbiol. 76: 4327, 2010; Biotechnol. Lett. 32: 405, 2010; Biotechnol. Bioeng. 103: 148, 2009; Metab. Eng. 10: 340, 2008). This talk will highlight our contributions to the understanding and harnessing of the anaerobic fermentation of glycerol in E. coli.

BIOGRAphICAL SKETCH – Ramon Gonzalez
Dr. Ramon Gonzalez is a Professor in the Department of Chemical & Biomolecular Engineering and the Department of Bioengineering at Rice University. He leads the laboratory for Metabolic Engineering and Biomanufacturing with the goal of engineering biological platforms for the synthesis of organic molecules with applications in fuel, chemical, and pharmaceutical production. Dr. Gonzalez is also the Founding Director of Rice’s Advanced Biomanufacturing Initiative (iBIO), the Editor-in-Chief of the Journal of Industrial Microbiology & Biotechnology (JIMB), and from 2012 to 2015 served as Program Director with the Advanced Research Projects Agency-Energy (ARPA-E) of the U.S. Department of Energy.

Dr. Gonzalez’s work has been published in many prestigious scientific journals, including Nature, Nature Biotechnology, Science, Nature Chemical Biology, Metabolic Engineering, ACS Synthetic Biology, and Applied and Environmental Microbiology. He is the lead inventor in 25 patents and patent applications, co-founded Glycos Biotechnologies, Inc., and has given more than 100 invited talks. In addition to his role as Editor-in-Chief of JIMB, Dr. Gonzalez is also a Member of the Editorial Board of Science, Applied & Environmental Microbiology, Biotechnology Journal, Metabolic Engineering Communications, Applied Biochemistry & Biotechnology, and Food Biotechnology. He was the Program Chair of the 2011 Annual
Meeting of the Society for Industrial Microbiology and Biotechnology (SIMB), served as a Director in the SIMB’s Board of Directors, and recently served as Director of the Rice Energy and Environment Initiative (EEi).

CV is available by request from adempsey@asmusa.org at ASM Headquarters

**LECTURER’S PERSONAL STATEMENT – Ramon Gonzalez**
Throughout my career, I have been committed to not only excellence in research, technology development and commercialization, but also to the sharing of my disciplinary expertise and professional experiences within the university and in the community at large. As an ASM Distinguished Lecturer, I will share my perspective on how the engineering of biology for energy applications is one of the most exciting technological opportunities of the 21st Century and one in which microbiologists will play an instrumental role. My lectures will cover a broad range of topics around the use of metabolic engineering and synthetic biology to engineer microorganisms for fuel, chemical, and pharmaceutical production.
Brian Hammer (term: 7/1/18 through 6/30/20)

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Primary Division H Genetics & Molecular Biology
Secondary Division N Microbial Ecology

LECTURE TOPICS AND DESCRIPTIONS – Brian Hammer

Control of Bacterial Biofilms by Quorum Sensing Small RNAs
*Vibrio cholerae* quorum sensing sRNAs, or Qrrs, utilize distinct post-transcriptional mechanisms to negatively regulate several mRNAs and also positively regulate other mRNA targets by direct base-pairing interactions. The target genes under control of the Qrrs participate in controlling biofilms and other behaviors important in the environment and in a human host. The Hammer lab has ongoing investigations of the role of *V. cholerae* quorum sensing and biofilm formation in bacterial communities.

Natural Transformation in *Vibrio cholerae*
The Hammer lab participated in identifying components of a regulatory network that coordinates expression of a competence apparatus and Type VI Secretion System in patient-derived *Vibrio cholerae* strains. Currently, the lab is determining the mechanisms of action of newly discovered toxins and signaling systems that coordinate the T6SS weapon in recently sequenced strains isolated from environmental sources. We are also defining how horizontal exchange of Type VI genes between strains by natural transformation alters microbial fitness and cell-cell dynamics in ecological communities.

Type VI Secretion Alters the Organization of Bacterial Communities
Aquatic pathogen *Vibrio cholerae* and other bacteria compete by injecting lethal toxins into neighboring bacterial or eukaryotic cells with a Type VI Secretion System. The lab’s recent work shows that Type VI-mediated aggression between bacteria in densely packed biofilms precipitates spatial reorganization of the community, which can favor the evolution of cooperation. In the intestinal tract of a fish host, Type VI-induced enhancement of gut peristalsis by *V. cholerae* can trigger the host to expel resident commensal competitors. This talk focuses on current efforts to uncover mechanisms by which contact-dependent bacteria-bacterial and bacterial-host interactions redefine microbial community composition.
Carving Out Your Niche (in Microbiology)
This talk is designed to facilitate frank discussions with students and postdocs about striving for a successful scientific career that balances their goals and values. Tips and strategies are covered that come from the experiences of the speaker, colleagues, and other associates.

BIOGRAPHICAL SKETCH – Brian Hammer
Dr. Hammer’s research interests focus on understanding mechanisms bacteria use to cooperate and compete in niches they occupy. His lab has identified components of regulatory networks in *Vibrio cholerae* that control the production of numerous factors, including secreted enzymes, biofilm matrix material, a molecular harpoon for toxifying neighboring cells, and an apparatus to take up foreign DNA. The lab’s current work aims to identify novel genes and regulatory connections of these networks, characterize the behaviors they control, and determine the contribution of these activities to the fitness and adaptability of this waterborne microbe in host and ecological settings. Dr. Hammer has been awarded several National Science Foundation grants including a prestigious early investigator CAREER award. He collaborates in several cross-disciplinary studies funded by the Gordon and Betty Moore Foundation, Simon’s Foundation, and the US-Israel Binational Science Foundation. Dr. Hammer has received multiple awards for teaching excellence, has authored 35 articles, is faculty advisor to his campus ASM Student Chapter, serves on the editorial board for the *Journal of Bacteriology*, and is an *ad hoc* reviewer for many ASM journals, including *Applied and Environmental Microbiology, Infection and Immunity*, and *mBio*.

CV is available by request from adempsey@asmusa.org at ASM Headquarters

LECTURER’S PERSONAL STATEMENT – Brian Hammer
I enjoy the challenge and excitement of engaging students and postdocs in conversations – about my lab’s research, about microbiology, and about being a research scientist. After earning my BS in Biology, my career path included several years as a lab technician, an aquatic ecology MS, and a medical microbiology Ph.D., prior to my postdoc. At Georgia Tech I run my research program and also teach courses spanning an introductory level “Biology of Sex and Death” course for non-majors to my upper level “Molecular Microbiology” course. In 2011 I received the Undergraduate Faculty of the Year award and in 2014 a Junior Faculty Teaching Excellence award from our campus Center for Teaching and Learning. In the spring of 2016 I presented an invited TEDx talk on microbial cooperation and conflict. I currently serve on the *Journal of Bacteriology* editorial board and as faculty advisor for my campus ASM Student Chapter. I present my research at ASM’s Microbe and Branch meetings, and I make it a point to bring postdocs, graduate students, undergraduates, and high school students to these events. Since 2008 I have mentored 17 undergraduates, 10 MS and 6 Ph.D. students, and 2 postdocs. My passion for training young researchers stems from the mentoring I received from my own advisors, extraordinary scientists and communicators. As an ASMDL I will relish the opportunity to serve as a model for students and postdocs discovering their unique career paths.
Barbara I. Kazmierczak, MD, Ph.D. (term: 7/1/18 through 6/30/20)

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ASM MEMBERSHIP AFFILIATION
Primary Division D Microbe-Host Interactions
Secondary Division B Microbial Pathogens

LECTURE TOPICS AND DESCRIPTIONS – Barbara I. Kazmierczak, MD, Ph.D.

Bacterial Cheating: Why Phenotypic Heterogeneity Improves Pathogen Fitness in the Host
Many Gram-negative pathogens cannot establish infections when Type 3 secretion systems are mutated. Type 3 secretion system (T3SS) expression is often bistable, however, resulting in a population of T3SS-ON and -OFF bacteria. Murine infection models demonstrate that “cheating” by T3SS-OFF bacteria can improve pathogen fitness during acute infection, and might favor persistence.

Should I Stay or Should I Go? Decision Points in Pseudomonas aeruginosa Biofilm Formation
Bacterial transitions between planktonic and surface-associated growth underlie the remarkable ability of P. aeruginosa to cause disease in plants, insects, rodents and humans. Although c-di-GMP plays an important role in the development of bacterial biofilms, recent evidence suggests that cAMP is an earlier signal that triggers irreversible surface attachment and virulence in P. aeruginosa.

A Physicist’s View of Bacterial Motility: Applying Single Particle Tracking to P. aeruginosa Motility
The single polar P. aeruginosa flagellum has a complicated regulatory apparatus compared to E. coli or Salmonella: two chemotaxis clusters, two motor-stators, and over two dozen chemoreceptors. Single particle tracking algorithms allow us to characterize how the P. aeruginosa flagellum moves these bacteria through 3D space, and to speculate how the unique behavior of this flagellum might allow P. aeruginosa to navigate through freshwater and sputum with ease.

The Cost of Virulence: Innate Immune Recognition of the Type 3 Secretion System
Bacterial virulence factors allow bacteria to infect a host – and yet they often trigger innate immune responses that lead to pathogen clearance. The opportunistic pathogen P. aeruginosa illustrates how this host-pathogen arms race plays out during acute pulmonary infection.
Gut Microbiome Acquisition and Maturation in Infants with Cystic Fibrosis
The genetic disease Cystic Fibrosis is marked by systemic and local inflammation which arises soon after birth. Our longitudinal study of infants with Cystic Fibrosis and healthy controls illustrates how this mucosal disease results in a dysbiotic and pro-inflammatory gut microbiome that fails to properly mature. Ongoing experiments to translate these findings to murine models will be described, and are likely to result in interesting discussions of what we can (and can’t learn) from germ-free mice.

BIOGRAPHICAL SKETCH – Barbara I. Kazmierczak, MD, Ph.D.
Dr. Kazmierczak is a physician-scientist interested in how opportunistic bacterial pathogens cause disease in human hosts. Her work on *Pseudomonas aeruginosa* examines how fundamental features of *Pseudomonas* biology – flagellar and pilus mediated motility, expression of Type 3 secretion, biofilm mediated colonization – are regulated and deployed during host infection. Using single cell tracking and analysis, she is elucidating how phenotypic variation within bacterial populations, rather than mean behavior, influences pathogen-host interactions. Dr. Kazmierczak’s lab also focuses on host-bacterial interactions that occur when infants establish their gut microbiome, and how this process is altered in newborns with Cystic Fibrosis. Her team’s findings suggest that infants with Cystic Fibrosis fail to remodel their microbiome in early life, resulting in a dysbiotic and pro-inflammatory consortium not seen in healthy children. These findings are being translated to murine Cystic Fibrosis models to identify mechanisms of microbiome remodeling that might be targeted therapeutically.

Dr. Kazmierczak’s work at the interface between microbiology and innate immunity has been recognized by awards from the Donaghue Foundation, Burroughs Wellcome Fund, and American Society for Clinical Investigation. She is a strong advocate for increasing access to graduate training in the life sciences and microbiology through her mentorship of high school and undergraduate students and her leadership of Yale’s MD-Ph.D. and BioMed SURF programs.

CV is available by request from adempsey@asmusa.org at ASM Headquarters

LECTURER’S PERSONAL STATEMENT – Barbara I. Kazmierczak, MD, Ph.D.
I’ve been a microbiologist all of my scientific life. The study of bacteria led to the discovery of transformation and transduction; elegant papers using bacteria described the operon and transcriptional regulation; restriction enzymes paved the way for genetic engineering. These elegant scientific stories hooked me on microbiology. Luckily for me, the field continues to remain exciting and relevant. I am glad to be part of the ASMDL program so that I can transmit my enthusiasm and passion for this field to a broad and diverse audience of students.

The lectures I’ve proposed focus on microbial pathogenesis, a field that integrates microbiology with cell biology and immunology. The topics illustrate the wide range of approaches used to answer questions in this field, emphasizing the collaborative and interdisciplinary aspects of science. I’d like to convey that we continue to learn new things about bacterial behavior that remain relevant to understanding ourselves in health and disease, and our world – and that these advances come about both from new technologies that allow us to see and analyze millions of
individual bacterial behaviors simultaneously, and from new applications of analytic models borrowed from physics, evolutionary biology…even economics.

Communicating the value and relevance of science is central to my professional life. I teach students and postdocs and clinical fellows – but I also teach my patients on the hospital Infectious Disease service, the high school students who join our lab each summer, and the parents and families of the undergraduate students that we bring to Yale for our immersive summer research program. This, I hope, has made me clear and straightforward in how I present scientific questions and data. For many students at the Branch meetings, I might be a bit different than their professors: a (youngish) woman, a physician, a director of an MD-Ph.D. program at a research-intensive institution – and yet someone whose core identity still revolves around pulling out agar plates from an incubator, or looking through a microscope at swimming bacteria. I hope I have the chance to tell them about my good fortune.
Linda Kenney (term: 7/1/18 through 6/30/20)

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ASM MEMBERSHIP AFFILIATION
Primary Division H Genetics & Molecular Biology
Secondary Division M Bacteriophage

LECTURE TOPICS AND DESCRIPTIONS – Linda Kenney

Peeking at a Pathogen in Action: Super-resolution Imaging of Salmonella Infection
Part of our current research is focused on high intensity imaging of Salmonella Typhi and Typhimurium infections in vivo. This work has allowed us to follow key processes during the infection process from a perspective not seen before.

Insights from Studying Individual Cells: A New View of pH Regulation in Bacteria
Unlike eukaryotes, bacteria undergo large changes in osmolality and cytoplasmic pH. It has been described that during acid stress, bacteria internal pH promptly acidifies, followed by recovery. Using pH imaging in single living cells, we showed that following acid stress, bacteria maintain an acidic cytoplasm and the osmotic stress transcription factor OmpR is required for acidification. The results indicate that activation of this response is distinct from previous mechanisms proposed for OmpR regulation. Preventing intracellular acidification of Salmonella renders it avirulent, suggesting that acid stress pathways represent a potential therapeutic target. These results emphasize the value of single cell analysis over studies of population averages.

How Do Bacteria Decide Between a Virulent vs Dormant Lifestyle: Watching Biofilms Form in vivo
After infection, Salmonella undertakes a complex journey through the host, transiting from the gut through lymphoid tissue and macrophages into the liver and spleen. To see how Salmonella decides between different outcomes during the infection process, we have used high intensity imaging of Salmonella Typhi and Typhimurium infections in the heterologous hosts C. elegans and zebrafish. These imaging techniques allow us to examine the process of biofilm formation in vivo.

Sometimes Your Enemy Is a Friend: Salmonella Pathogenesis vs Tumor Regression
Salmonella can cause very serious illness and death of an infected host. However, Salmonella is also very effective at targeting tumor cells and promoting regression of tumors in an infected host. We are examining the mechanisms of tumor targeting by Salmonella using microfluidic
spheroid models, with the goal of developing strains that can serve as tumor antigen delivery devices.

**BIOGRAPHICAL SKETCH – Linda Kenney**

Linda Kenney is currently a Professor in the Department of Microbiology & Immunology at the University of Illinois, Chicago, and a principal investigator at the Mechanobiology Institute at the National University of Singapore. She obtained a BS in Biology at the University of Iowa, followed by a Ph.D. in Physiology and Biophysics at the University of Pennsylvania. After completing her Ph.D., she conducted postdoctoral work in biophysics at Yale University followed by three years as a Research Associate in bacterial genetics at Princeton University. She took a position in the Department of Molecular Microbiology & Immunology at Oregon Health Science University, where she progressed through the academic ranks to tenure, then moved to the University of Illinois, Chicago in 2003. In addition to her scientific research that has focused on *E. coli* and *Salmonella*, Linda has played an active role in science on editorial boards of highly regarded journals, on federal study sections, and with active membership in the Biophysical Society and the American Society for Microbiology. She has served on editorial boards of ASM journals, on the ASM Press Books Committee, and on the ASM International Fellowship Awards Committee. She has served as Chair of the International Microbiology Education Committee, as Group IV representative and as a Councilor-at-large, and has organized many sessions for ASM meetings. Her research is currently funded by two NIH grants. Linda’s current research is focused on high intensity imaging of *Salmonella* Typhi and Typhimurium infections in the heterologous hosts *C. elegans* and zebrafish; characterization of the invasive phenotype of a drug-resistant *Salmonella* strain that causes high mortality in HIV patients; and examining the mechanisms of tumor targeting by *Salmonella* using microfluidic spheroid models, with the goal of developing strains that can serve as tumor antigen delivery devices.

CV is available by request from adempsey@asmusa.org at ASM Headquarters

**LECTURER’S PERSONAL STATEMENT – Linda Kenney**

As an ASM Distinguished Lecturer I look forward to sharing my scientific experiences and engaging with budding young scientists. I have a unique point of view as a result of my broad background in both biophysics and microbiology. I am not afraid of challenging the status quo and as a result, our work has challenged existing paradigms in three main areas: two-component signaling and how sensor kinases sense their environment; how *E. coli* and *Salmonella* sense and respond to acid and osmotic stress; and how *Salmonella* maintains the carrier state. Our recent focus on super-resolution imaging of *Salmonella* infections *in vivo* transmits the excitement of research with profound imagery. The message I can convey is to be critical and follow your results rather than being confined by existing paradigms. I have extensive international experience and our work is interdisciplinary. I often travel throughout Asia to recruit graduate students and give talks. I have also had the pleasure of teaching short courses in Mexico and Chile and sponsored ASM international fellows in my laboratory. I am especially interested in mentoring young women scientists and towards this aim, I organized a Women in Science group in the Mechanobiology Institute ([https://mbi.nus.edu.sg/education/outreach/mbi-women-in-science/](https://mbi.nus.edu.sg/education/outreach/mbi-women-in-science/)). We organized biannual symposia of women scientists in Singapore, held numerous outreach events and sponsored many inspirational talks by women scientists. Finally, I have an extensive service record in both the Biophysical Society and ASM.
Dr. Joel E. Kostka  (term: 7/1/18 through 6/30/20)

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ASM MEMBERSHIP AFFILIATION
Primary Division N  Microbial Ecology  
Secondary Division Q  Environmental and General Applied Microbiology

LECTURE TOPICS AND DESCRIPTIONS – Dr. Joel E. Kostka

A Moveable Feast: The Response of Benthic Microbes to the Deepwater Horizon Oil Well Blowout in the Gulf of Mexico
In this talk, I begin with the ecosystem services provided by the Gulf of Mexico to the United States, emphasizing the vastness of this “small” ocean basin and its huge ecological diversity. I describe the science of the Deepwater Horizon oil spill and response to the disaster, with photos and video describing the scale of the disaster. The second half of the talk is a case study of our ongoing research (2010 to present) on how microbes impact the fate of oil contamination on beaches of the Gulf coast. We observed a bloom of successive microbial populations that degrade oil, we isolated new hydrocarbon-degrading bacteria, and we observe major impacts of oil on the microbial nitrogen cycle.

The Sphagnum Phytobiome: A Team of Ecosystem Engineers in Resource Limited Peatlands
Peatlands store approximately one-third of all global soil carbon and are climatically sensitive. This talk focuses on the microbiome of peat moss plants, Sphagnum spp., which often dominate primary production in northern peatlands. Sphagnum phytobiomes (microbiome + plant host + surrounding environment) are ecosystem engineers that play a major role in the carbon and nitrogen cycles of climatically sensitive northern ecosystems. Our ongoing research employs cutting-edge approaches (metatranscriptomics, Chip-SIP) to investigate the metabolically active microbial populations that mediate nitrogen fixation and methanotrophy. While nitrogen-fixing microbiome members are dominated by cyanobacteria of the Nostocales, multiple lines of evidence indicate that members of the Rhizobiales play a key role in coupling nitrogen fixation to methanotrophy, and biogeochemical field data show that N fixation comprises a major N source for nutrient-poor peatlands.

Can Peat Beat the Heat?: Stability of the Peatland Carbon Bank to Deep Warming
In this talk, I explore the response of large belowground carbon stores, greenhouse gas emissions, and heterotrophic microbial communities in peatlands to climate change drivers, warming and CO₂ enrichment. As part of the SPRUCE (http://mnspruce.ornl.gov) experiment
sponsored by the U.S. Department of Energy, peat up to 2 m deep is experimentally warmed up to 9°C above ambient in a whole ecosystem climate manipulation conducted in northern Minnesota. Although CH₄ emissions were found to increase exponentially with deep heating, the response was due solely to the warming effect on surface peat. No changes with warming were seen in microbial communities nor did geochemical analyses provide evidence of enhanced peat carbon degradation suggesting that deep peat is stable under increasing temperatures. Since air heating and CO₂ enrichment began in 2015, changes with warming have been observed in plant as well as microbial communities.

**New Pathways of Organic Matter Decomposition Limit Methane Emission from Wetland Soils**
In freshwater wetlands such as peatlands, soils become anoxic at the surface and the majority of organic matter is decomposed through microbial consortia that are believed to primarily terminate in methanogenesis or methane (CH₄) production. In peat from high latitude *Sphagnum*-dominated peatlands that are critical to the global carbon cycle, state-of-the-art environmental metabolomics measurements revealed new pathways for organic matter degradation in peatlands, whereby electrons are deposited to the organic matter itself rather than to CH₄. This mechanism has also been observed to reduce CH₄ production in the cow rumen. An examination of past research on animal hosts suggests many parallels between the chemical and microbiological hydrogenation of organic matter between peatlands and the rumen. Because CH₄ has a sustained flux warming potential about 45 times higher than that of CO₂, mechanisms that alter CH₄ production ratios during peat mineralization have important implications for environmental change.

**Biogeography of Benthic Microbial Communities in the Gulf of Mexico**
The seafloor of the deep ocean is among the largest and most understudied of habitats on Earth. Here I present the largest dataset on benthic marine microbial communities ever assembled. The primary objectives in this study were to characterize biogeographic patterns in microbial populations in Gulf of Mexico sediments, and use these results to constrain impacts of petroleum hydrocarbons from the Deepwater Horizon (DWH) oil spill to microbial communities. Benthic microbial communities show remarkably consistent patterns across large (km) spatial and temporal scales, with biogeographic patterns primarily related to sediment depth (likely a proxy for oxygen concentration) and water depth (likely a proxy for carbon content). The statistical power of this dataset and our observed patterns in microbial community composition have enabled the construction of a model detailing the distributions of microbial populations in deep oceans sediments across the Gulf of Mexico. Results from this study show localized impacts to the DWH disaster and rebound by 2012 to an indistinguishable state from the unimpacted seafloor.

**BIOGRAPHICAL SKETCH – Dr. Joel E. Kostka**
Dr. Joel E. Kostka is Professor and Associate Chair for Research in the School of Biological Sciences as well as the School of Earth and Atmospheric Sciences at the Georgia Institute of Technology. He is internationally recognized for his research in environmental microbiology which focuses on characterizing the role of microorganisms in ecosystem functioning, especially in the context of bioremediation and climate change. Dr. Kostka is extensively published with over 110 peer-reviewed publications. He has served on numerous national and international review panels and expert committees on energy, bioremediation, and environmental microbiology. In 2013, Dr. Kostka was honored as a Georgia Power Professor of Excellence, and
he is currently a co-PI of the C-IMAGE3 consortium funded by the Gulf of Mexico Research Initiative to study the environmental consequences of petroleum hydrocarbon release on living marine resources and ecosystem health. In 2011, he coauthored the report, “Microbes and Oil Spills: Frequently Asked Questions,” published by the American Academy of Microbiology. In 2016, he participated in the ASM-AGU Colloquium on “Interactions Between Climate Change & Microbial Ecosystems.” From 2009-2013, Dr. Kostka was Chair of ASM’s Division N, Microbial Ecology, and he served as editor of Applied and Environmental Microbiology from 2011-2017.

CV is available by request from adempsey@asmusa.org at ASM Headquarters

LECTURER’S PERSONAL STATEMENT – Dr. Joel E. Kostka
I was first introduced to ASM by attending a Branch meeting in Gatlinburg, Tennessee, while I was a Masters student. There I met and interacted with D.C. White, for whom the D.C. White Research and Mentoring Award is named. D.C. graciously answered my questions and made me feel like I belonged as a microbiologist. My experience at the Branch meeting was largely responsible for my decision to enter the field of environmental microbiology. I want to participate in the ASM Distinguished Lecturer Program so that I can give back the support and encouragement that I received at many ASM meetings to current students and postdocs. I have a passion for supporting ASM, having served as Division Chair and as Editor for Applied and Environmental Microbiology. I bring over 20 years of experience in the mentoring of students and postdoctoral researchers as well as giving plenary talks. In August 2017, I was elected Chair of the Gordon Conference in Applied and Environmental Microbiology in part based on the presentation of an invited talk as well as interactions with students/ postdocs at the conference. In September 2017, I was one of 6 scientists to speak at the 25th Anniversary of the Max Planck Institute for Marine Microbiology in Bremen, Germany, a premier institution in my field. I teach introductory microbiology and microbial ecology, and I very much believe that it is my professional mission to excite students about the myriad of ways that microbes benefit society, thereby catalyzing their entrance into the field.
Susan Lynch (term: 7/1/17 through 6/30/19)

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ASM MEMBERSHIP AFFILIATION
Primary Division N Microbial Ecology
Secondary Division D Microbe-Host Interactions

LECTURE TOPICS AND DESCRIPTIONS – Susan Lynch

Gut Microbiome and Allergic Asthma
Lecture will cover studies of the early life gut microbiome and its role in allergic sensitization and asthma development in childhood. It will also include information on the microbiome of the built environment and its relationship with allergic asthma outcomes and on newer approaches aimed at targeting the gut microbiome in early life to prevent disease development.

Airway Microbiome and Chronic Inflammatory Disease
Studies of the airway microbiome in chronic sinusitis and childhood and adult asthma reveal relationships between the composition and activities of microbes on the airway mucosal surface and their capacity to drive chronic inflammation.

Gut Microbiome and Inflammatory Bowel Disease
Relationships between the gut microbe and IBD, including the emerging role of pathogenic states in driving distinct immune dysfunction within this patient population and microbiome manipulation approaches (fecal microbial therapy, rationally designed microbial cocktails) to mitigate disease.

BIOGRAPHICAL SKETCH – Susan Lynch
Dr. Lynch is an Associate Professor of Medicine at the University of California, San Francisco, where she also directs the Microbiome Research Core and acts as Associate Director of the Microbiome in Inflammatory Disease Program. Her research program focuses primarily on the gastrointestinal microbiome and its role in established chronic inflammatory diseases, including airway diseases. She is extensively published with over 100 peer-reviewed publications, and holds six patents. Dr. Lynch has been awarded the Rebecca Buckley Lectureship by the American Academy of Allergy, Asthma and Immunology, was featured in International Innovation: Women in Healthcare, and was named one of Foreign Policy magazine’s “Global Thinkers” in 2016. She serves on the National Academy of Science Committee on Advancing
Understanding of the Implications of Environmental-Chemical Interactions with the Human Microbiomes, and has recently founded Siolta Therapeutics, which develops next-generation microbiome therapeutics.

CV is available by request from adempsey@asmusa.org at ASM Headquarters

LECTURER’S PERSONAL STATEMENT – Susan Lynch
Microbiology has been my passion from a very young age, and has been an incredibly rewarding and fulfilling career to date. Though trained in bacterial physiology, I made the leap into the field of human microbiome research well over a decade ago, publishing our first microbiota paper in 2007. The combination of basic microbiology coupled with microbial ecology provides me with a relatively unique perspective in a field currently dominated by those with computational, medical or immunology training. I am happy to be part of the ASMDL program as a means to encourage more microbiologists, particularly those in the early stages of training, to enter the nascent and exciting field of human microbial ecology so their voices and perspectives can play a role in shaping the literature and thinking in the field. Inter-disciplinary human research, with microbiology as a key focus, represents a potentially transformative field; preparing the next generation of microbiologists to lead this field represents one of my major motivations.
Ilhem Messaoudi-Powers, Ph.D. (term: 7/1/17 through 6/30/19)

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ASM MEMBERSHIP AFFILIATION
Primary Division E Immunology
Secondary Division D Microbe-Host Interactions

LECTURE TOPICS AND DESCRIPTIONS – Ilhem Messaoudi-Powers, Ph.D.

Ebola Virus: From Mechanisms of Disease to Vaccination Strategies
This lecture will discuss why Ebola virus is so deadly and vaccination strategies to protect populations at risk.

Aging and Immune Response to Infection
By 2020, one third of the US population will be older than 65. This group is very vulnerable to specific infections. This lecture will explain why older individuals are at greater risk for infection and what we are doing to mitigate this risk.

How Alcohol Consumption Alters Our Immune Defense Mechanisms
Almost 70% of the US population consumes alcohol and 10-14% develop alcohol use disorder. This is associated with increased risk of infection, but the mechanisms are not very clear. This lecture will discuss how alcohol consumption alters the epigenetic and transcriptional landscape of the immune system.

Obesity During Pregnancy and Its Impact on Neonatal Immunity
Infants born to mothers who started their pregnancy as obese experience a greater number of admissions to the neonatal intensive care unit due to sepsis and enterocolitis. The reasons behind this higher vulnerability to infection are starting to emerge. This lecture will review our current understanding of the neonatal immune system and the impact of maternal obesity.

BIOGRAPHICAL SKETCH – Ilhem Messaoudi-Powers, Ph.D.
Dr. Ilhem Messaoudi is an Associate Professor in the Department of Molecular Biology and Biochemistry and an Affiliate Scientist at the Oregon National Primate Research Center. She received her B.Sc. in Biochemistry from Lafayette College (Easton, Pennsylvania) in 1996, followed by a joint doctorate degree in immunology from The Weill Graduate School of Medical Sciences of Cornell University and Memorial Sloan Kettering Cancer Center in 2001. She then
carried out her post-doctoral training at Oregon Health and Science University (OHSU) and Oregon National Primate Research Center. Dr. Messaoudi became an Assistant Professor at the Vaccine and Gene Therapy Institute, OHSU in October 2008, and in January 2013 joined the University of California, Riverside School of Medicine as an Associate Professor. Her research program is focused on studying: 1) host-pathogen interactions in a variety of viral infection models; 2) impact of chronic ethanol consumption on immune function; 3) impact of maternal obesity and nutrition on neonatal immunity; and 4) impact of age-related decline in sex steroid levels (and estrogen and androgen supplementation) on immunity. Dr. Messaoudi is the recipient of the Nathan Shock Junior Investigator Award, Brookdale Leadership in Aging Fellowship, Dolph O’Adams Award and Women and Diversity Paper of the Year from the Society of Leukocyte Biology.

CV is available by request from adempsey@asmusa.org at ASM Headquarters

LECTURER’S PERSONAL STATEMENT – Ilhem Messaoudi-Powers, Ph.D.
My journey to becoming a biomedical researcher who studies infectious diseases and vaccines has been far from traditional and has imbued me with a strong commitment to training the next generation of microbiologists. I was born and raised in the small African nation of Tunisia. My interest in microbiology was cultivated as I watched my paraplegic aunt struggle daily with the debilitating effects of polio. I was fortunate to pursue a Bachelor of Science in Biochemistry and then a Ph.D. in immunology in the United States. My life experiences are not dissimilar to those of first generation students who have to overcome significant hurdles in the pursuit of higher education. Moreover, growing up as a young Arab woman who wanted to be a microbiologist like Louis Pasteur, I know first-hand how insurmountable the challenges of restrictive cultural norms, gender stereotypes, and implicit bias can seem. I am greatly appreciative of the support I received and cognizant that my successes come on the shoulders of others. I am committed to repaying that forward, and believe that the ASMDL program will provide me with an opportunity to motivate and inspire the next generation of scientists, especially those from under-represented minorities. I will bring to this program not only my love for microbiology and my enthusiasm for the changes that ASM is undergoing, but a rare expertise in viral immunology with an emphasis in nonhuman primate models of emerging viral diseases and my international upbringing that allows me to speak to a broader audience.
Harry L.T. Mobley, Ph.D. (term: 7/1/17 through 6/30/19)

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ASM MEMBERSHIP AFFILIATION
Primary Division B Microbial Pathogens
Secondary Division D Microbe-Host Interactions

LECTURE TOPICS AND DESCRIPTIONS – Harry L.T. Mobley, Ph.D.

Bacterial Gene Expression During Human Infection
Our traditional definition of bacterial virulence has been based on in vitro measurements of adherence, iron acquisition, toxin activity, protein secretion, and motility. Now we must consider what metabolic pathways are in play, what transport systems must be active, and, most importantly, which genes are actually being expressed during human infection. Novel techniques including RNA-Seq and Tn-Seq allow us to identify the most highly expressed genes and which genes are essential during actual infections. This leads to a better understanding of how bacterial pathogens outfox our immune defenses.

Strategies for Development of Vaccines Against Mucosal Infections
Using our current genomic tools, we no longer have to guess about what components we should include in a vaccine against a mucosal infection. Based on the genomic sequence of a bacterium, we can predict and test for which proteins reside on the bacterial surface, determine whether an immune response detects the antigen during experimental infection, determine precisely which genes are expressed during experimental, and in some cases, human infection, and determine whether those genes are essential for colonization and infection. Using all of these criteria, rational selection of antigens for a vaccine can be made and quickly tested.

Stones, Spears and Swarming: Bacterial Social Aggression at Its Worst
One of the most extraordinary bacterial species is a creature called Proteus mirabilis. This Gram-negative bacterial rod, named for the Greek god who changed shape to avoid capture, has fascinated microbiologists for more than a century with its unique swarming differentiation on agar plates, killing of opposing bacteria, and potent urease activity responsible for bladder and kidney stone formation. Transcriptome profiling during both host infection and swarming motility, coupled with the genome sequence, has revealed the mechanism of interbacterial competition and killing by use of a type VI secretion system, which injects toxins into the opposing bacteria. The bacterium also switches neatly between an adherent form and wildly swarming motile form.
BIOGRAPHICAL SKETCH – Harry L.T. Mobley, Ph.D.
Harry Mobley received his B.S. degree in Biology from Emory University in 1975 and Ph.D. in Microbiology and Immunology from University of Louisville in 1981. He conducted postdoctoral training in Biological Chemistry and Bacterial Genetics at the University of Maryland School of Medicine. He served on the faculty there from 1984 until 2004 and led the graduate program. In 2004, Mobley moved to the University of Michigan to chair the Department of Microbiology and Immunology and was installed as the Frederick G. Novy Collegiate Professor. Dr. Mobley, a fellow in AAAS and the American Academy of Microbiology, chaired the Pathogenesis and Host Response Mechanisms group of ASM. He serves on the editorial review board of Infection and Immunity and on NIH study sections. His research interests focus on the molecular mechanisms of bacterial pathogenesis. His lab studies virulence mechanisms of uropathogenic Escherichia coli and Proteus mirabilis and formerly studied Helicobacter pylori that causes peptic ulcer disease. Dr. Mobley has published 240 peer-reviewed articles, 38 book chapters and 4 books. His work has been cited in the literature nearly 15,000 times. He has trained 29 Ph.D. students and 34 postdoctoral fellows, and has delivered 201 invited lectures in 20 countries.

CV is available by request from adempsey@asmusa.org at ASM Headquarters

LECTURER’S PERSONAL STATEMENT – Harry L.T. Mobley, Ph.D.
I currently serve as Professor and Chair of the Department of Microbiology and Immunology and served as Graduate Program Director at my previous institution, University of Maryland School of Medicine. I am most proud of receiving university-wide mentoring awards at both Maryland and Michigan. ASM has shaped my career as a microbiologist, being a member since 1977. During that time, I was invited speaker at eleven meetings including Division B Lecture in 2014 and have organized five sessions. I have been committed to service to ASM, serving as Division B Chair and two terms as Division II (Pathogenesis and Host Response Mechanisms) Representative and on General Meeting Planning and Colloquium Committees. I was honored as candidate for President-Elect in 2011. I have served on the Infection and Immunity Editorial Board since 1993 and have edited two books for ASM Press: Urinary Tract Infections - Molecular Pathogenesis and Clinical Management; and Helicobacter pylori - Physiology and Genetics. My lab has presented 148 abstracts at the General Meeting (Microbe Meeting). With respect to speaking, I have delivered 201 invited lectures in 20 countries. Indeed, presenting talks for the purpose of educating the next generation of scientists is one of my greatest joys. Interacting with students and postdocs could not be more enjoyable and rewarding. Seeing the development of young scientists and their career development is one reason I do the job I do. I believe that I could represent ASM well in the ASMDL program, reaching out to our next career microbiologists and passing on the passion for our field.
Beronda L. Montgomery (term: 7/1/17 through 6/30/19)

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ASM MEMBERSHIP AFFILIATION
Primary Division H Genetics & Molecular Biology
Secondary Division K Microbial Physiology & Metabolism

LECTURE TOPICS AND DESCRIPTIONS – Beronda L. Montgomery

Seeing the Light: Color Vision and Developmental Acclimation in Cyanobacteria
Photosynthetic organisms exhibit finely tuned abilities to sense and respond to changes in their ambient environment. As light is used to drive photosynthesis, which results in the production of chemical energy and important reductants, the perception of light and the resulting physiological and developmental changes that occur are among the most important adaptations in these organisms. Cyanobacteria respond to changes in light in a process known as chromatic acclimation, which tunes physiology and photosynthetic pigmentation to light cues. The photoreceptors and associated signaling pathways used to tune cellular responses and thus organismal fitness in cyanobacteria are described.

First Insight into Second Messengers: Roles of Cyclic Dinucleotides in Environmental Responses in Cyanobacteria
Cyclic dinucleotides have only recently been investigated as second messengers in photosynthetic bacteria, including cyanobacteria. Photosynthetic organisms, such as cyanobacteria, are sensitive to changes in the light environment, a response which is linked to their ability to use light energy for production of chemical energy in the form of sugars. Recent studies indicated that second messengers are key molecules used by cyanobacteria to adapt to changes in the external environment. Ongoing studies in the Montgomery lab are providing significant insight into the roles of these second messengers in regulating life styles and evolution of cyanobacterial strains and providing tools for use in biotechnological or optogenetic applications.

Shaping Up: Photoregulation of Cellular Morphology in Cyanobacteria
Photosynthetic organisms depend upon light for carbon fixation and production of reductant. Thus, the ability to adapt to changes in the photoenvironment is critical. Some cyanobacteria alter the shape and volume of their cells in response to changes in ambient light, including changes in light intensity and predominant wavelengths or colors of light available. In this talk, the distinct molecular mechanisms used by these organisms to “shape up” in response to light are
discussed, including parallels to known bacterial morphogenesis-regulating mechanisms and novel means used by cyanobacteria.

**Lighting the Way: Building Bridges to Access and Success**
This topic involves translating the lessons that have emerged from investigating the specific ways in which largely immobile organisms adapt their patterns of growth and development to fluctuations in external environmental parameters to increase their survival and productivity to mentoring and professional development interventions. These lessons are intended to inform practices that promote the success of students and junior faculty in academic sciences. Discussed are evidence-based practices for supporting the comprehensive development of a diverse range of students and postdoctoral scientists as experimentalists, scientific thinkers and future independent scientists and practitioners.

**Cultivating a Career: From Seeds of Inspiration to a Harvest of Discovery, Mentoring & Transformation**
The cultivation of an integrated career that supports progressive research, education and service requires planning, strategic and intentional engagement of mentors, and career envisioning. I describe my path to date which has included key branch points that have advanced my core research in photobiology, while providing complementary opportunities to acquire new skills and integrate engagement in mentoring and leadership scholarship.

**BIOGRAPHICAL SKETCH – Beronda L. Montgomery**
Dr. Beronda Montgomery completed doctoral studies at the University of California, Davis and was a National Science Foundation (NSF) funded postdoctoral fellow at Indiana University. She is MSU Foundation Professor of Biochemistry & Molecular Biology and Microbiology & Molecular Genetics in the Department of Energy Plant Research Laboratory and Assistant Provost for Faculty Development – Research at Michigan State University. Dr. Montgomery’s laboratory investigates the mechanisms by which organisms such as plants and cyanobacteria which have limited mobility are able to monitor and adjust to changes in their external environment. The ability of these largely immobile organisms to adapt their patterns of growth and development to fluctuations in external environmental parameters, such as light and nutrient availability, increases their survival and maximizes their growth and productivity. Dr. Montgomery also conducts scholarship and training initiatives on mentoring, including issues related to mentoring diverse students and junior scientists, as well as faculty development. Her scholarly efforts have been recognized by receipt of an NSF CAREER Award, selection as a finalist in the 2014 Howard Hughes Medical Institute (HHMI) Professors Competition, and as 2015 Michigan State University Nominee for the Council for Advancement and Support of Education (CASE) U.S. Professor of the Year Award.

CV is available by request from adempsey@asmusa.org at ASM Headquarters

**LECTURER’S PERSONAL STATEMENT – Beronda L. Montgomery**
Participation in the ASMDL program provides new opportunities for me to engage with the microbiology community as a scientist-educator. It has been my long-standing career philosophy to build a competitive research program, while simultaneously ensuring that the research and training environment provides the highest level of evidence-based mentoring to
ensure success of each of the individuals with whom I have the privilege to work. In these efforts, my group has developed robust research to understand dynamic molecular processes used by photosynthetic organisms to adapt to changes in their environment. As a part of my efforts to promote research excellence and sustained mentoring of scientists, including a targeted focus on those individuals from groups underrepresented in academe, I served for six years as Chair of the Robert D. Watkins Graduate Research Fellowship and Professional Development Programs. Initially largely an ASM fellowship program, the Watkins Fellowship grew into a comprehensive academic and professional development program for sustained exposure of doctoral students to diverse career opportunities, long-term engagement of individuals in supportive career networks, and the provision of progressive mentoring under my leadership. Additionally, I served as founding chair of the steering committee and co-PI of a NSF-funded structured mentoring effort with ASM. In additional efforts in support of graduate students and postdocs, I serve as a mentor training specialist and as a consultant with several national graduate and postdoctoral training programs and academic institutions on issues related to mentoring diverse students and junior scientists, as well as development and support of faculty.
**Dr. Cheryl A. Nickerson** *(term: 7/1/18 through 6/30/20)*

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**ASM MEMBERSHIP AFFILIATION**

Primary Division B Microbial Pathogens  
Secondary Division D Microbe-Host Interactions

**LECTURE TOPICS AND DESCRIPTIONS – Dr. Cheryl A. Nickerson**

**Force of Nature: Physiological Fluid Shear Regulates Bacterial Pathogenesis**  
Bacterial pathogens experience wide fluctuations in fluid shear forces during the infection process. While these forces are relevant to those experienced during the natural lifecycles of bacterial and human cells, they have been widely overlooked as environmental stressors with potential to dictate the outcome of infection. This talk describes how bacteria are “hardwired” to respond in unexpected ways to physiological force fluid shear forces encountered in the infected host and the resulting impact on microbial gene expression, pathogenesis-related stress responses and virulence. This rapidly emerging area of research is leading to the discovery of entire classes of microbial genes and proteins involved in host interactions not previously identified when microorganisms are grown conventionally, and has promising potential for new strategies to outpace infectious disease.

**Outpacing Infectious Disease – Mimicking the Host-Pathogen Microenvironment**  
One of the grand challenges of the 21st century is to understand how biological, chemical, and physical cues are integrated in cells (microbial and human), and how this integration results in coordinated structural and functional changes at the cellular, tissue, organ, and organism level that impact host-pathogen interactions. This talk will provide an overview of innovative model pathogenesis systems for studying mucosal infections in humans and key factors that are known to impact infectious disease outcomes.

**Organotypic 3-D Tissue Models: Innovative and Predictive Platforms to Study Host-Pathogen Interactions and Infectious Disease**  
 Appropriately simulating the three-dimensional (3-D) environment in which tissues normally develop and function is crucial for the establishment of *in vitro* tissue models that can be used for more meaningful dissection of host-pathogen interactions. This presentation highlights how dynamic bioreactor technology has been used to establish a series of 3-D organotypic tissue models that range in complexity from a single cell type to multicellular co-culture models, including immune cells, as predictive human surrogates to study host-pathogen interactions and...
predict *in vivo*-like infectious disease mechanisms not mimicked by conventional cell culture models.

**Spaceflight-induced Alterations in Microbial Virulence and Host-Pathogen Interactions: Novel Insight into Infectious Disease Mechanisms**

The quiescent microgravity environment of spaceflight has been shown to elicit unexpected changes in microbial gene expression, stress responses, and virulence that are not observed using traditional experimental approaches on Earth, where the force of gravity can mask key cellular responses. This talk will highlight how the extreme environment of spaceflight is becoming an emerging platform to provide novel insight into biological response parameters from both the host and pathogen perspective that have potential for innovative solutions toward treatment and control of infectious diseases both in space and on Earth.

**BIOGRAPHICAL SKETCH – Dr. Cheryl A. Nickerson**

Dr. Cheryl A. Nickerson is a Professor in the School of Life Sciences, at the Biodesign Institute at Arizona State University. Her internationally recognized research takes a highly multidisciplinary and innovative approach that blends microbiology, tissue engineering, and physics to mimic the dynamic interactions between the host, its microenvironment, and the pathogens that lead to infection and disease. She focuses on characterizing the effects of biomechanical forces on bacterial pathogenesis mechanisms and host-pathogen interactions that regulate the transition between normal homeostasis and infectious disease. Her laboratory has developed several innovative model pathogenesis systems to study these processes, including 3-D organotypic tissue culture models as predictive platforms to study host-pathogen interactions, and characterizing pathogen responses to physiological fluid shear forces encountered in the infected host, as well as in the microgravity environment of spaceflight. Her research has flown on numerous NASA Shuttle missions, the International Space Station, and on SpaceX missions. She is a recipient of the Presidential Early Career Award for Scientists and Engineers and NASA’s Exceptional Scientific Achievement Medal. She serves as founding Editor-in-Chief of the *Nature* journal *npj Microgravity*, and was selected as a NASA Astronaut candidate finalist.

CV is available by request from adempsey@asmusa.org at ASM Headquarters

**LECTURER’S PERSONAL STATEMENT – Dr. Cheryl A. Nickerson**

Teaching and research go hand-in-hand: one cannot exist without the other. It is our responsibility to provide a stimulating and interdisciplinary educational and research training environment for the next generation of scientists that will equip them with the knowledge and skills necessary for their success and leadership to solve global microbial challenges. In an era that promotes the integrated study of biological systems with engineering and physical sciences as the prevalent concept in contemporary scientific thinking, scientists must work in collaborative teams that reflect the growing multidisciplinary nature of microbiology. An important aspect of my career is the transdisciplinary mentorship and education of i) undergraduate and graduate microbiology students in the classroom (resulting in multiple teaching awards), and ii) undergraduate/graduate students, postdoctoral fellows, and early career faculty in their laboratory research activities – many of whom have gone on to hold prestigious positions in academia, industry and government. The opportunity to guide and mentor these individuals and to learn from them has been integral to the progress of my research program and
to my own personal and professional development. My spaceflight microbiology experiments with NASA are a perfect example of how unconventional, multidisciplinary research can provide an ideal foundation to expand a student’s thinking process that transcends traditional boundaries. I appreciate the opportunity and privilege to share my experience and excitement for microbiology through the ASMDL program to help develop young scientists who are poised to become leaders in academic/research venues where breadth and interdisciplinary vision are required to solve complex problems.
Donald W. Schaffner  *(term: 7/1/17 through 6/30/19)*

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**ASM MEMBERSHIP AFFILIATION**

Primary Division  P  Food Microbiology  
Secondary Division  Y  Public Health

**LECTURE TOPICS AND DESCRIPTIONS – Donald W. Schaffner**

**Should You Eat That? The Science behind the Five-second Rule**
The popular notion of the “five-second rule” is that food dropped on the floor and left there for <5 seconds is “safe” because bacteria need time to transfer. Until recently, the rule had only been explored by a single study in the published literature and on at least two television shows. Dr. Schaffner and a graduate student recently published an extensive study in the ASM journal *Applied and Environmental Microbiology* with over 2,500 observations exploring the science behind the rule. In this talk Dr. Schaffner explains his reasons for undertaking this research, and the relevance of the findings for everyday life.

**Handwashing and Hand Sanitizers from the Perspective of a Food Microbiologist**
Over the past 15 years, Dr. Schaffner and his team have published on quantification and variability of bacterial cross-contamination rates in the kitchen, the effectiveness of glove barriers to bacterial cross-contamination, the suitability of alcohol-based hand sanitizer as an alternative to handwashing, an analysis of the published literature on the effectiveness of antimicrobial soaps, the effect of hand wash duration, soap use, ground beef debris, and drying methods on the removal of bacteria on hands, and the use of microbial risk assessment techniques to quantify the effect of antibacterial hand hygiene products on risk of shigellosis. This talk will provide an overview of how one food microbiologist looks at foodborne disease risk, and the role that handwashing and hand sanitizers can play in reducing that risk.

**Food Safety Modeling and Risk Assessment for Fun and Profit**
This talk will provide an overview of the predictive microbiology and quantitative microbial risk assessment (QMRA) as practiced by Dr. Schaffner’s lab. A variety of case studies will be used to demonstrate the application of these two tools. Case studies can be customized to areas of interest to the local Branch.
BIOGRAPHICAL SKETCH – Donald W. Schaffner
Dr. Donald W. Schaffner is Distinguished Professor and Extension Specialist in Food Science at Rutgers University. His research interests include quantitative microbial risk assessment and predictive food microbiology and he has published more than 150 peer-reviewed papers on these and other topics. Dr. Schaffner has served on a variety of national and international expert committees, including service to the U.S. National Academy of Sciences and the World Health Organization and Food and Agriculture Organization of the United Nations. Dr. Schaffner is active in several scientific associations including the International Association for Food Protection, the Institute of Food Technologists, the Society for Risk Analysis, and the American Society for Microbiology. He was elected a Fellow of the IFT in 2010, a Fellow of the American Academy of Microbiology in 2014, and of IAFP in 2017, and is an Editor for the ASM journal *Applied and Environmental Microbiology*. Dr. Schaffner holds a B.S. in Food Science from Cornell University and an M.S. and Ph.D. in Food Science and Technology from the University of Georgia. He co-hosts a podcast on microbial food safety for professionals and the public, available at http://foodsafetytalk.com.

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LECTURER’S PERSONAL STATEMENT – Donald W. Schaffner
I have been part of similar speaker programs for the Institute of Food Technologists, and the International Association for Food Protection in the past, and I have enjoyed the experience of traveling to speak to local organizations affiliated with national groups of which I am a member. I was delighted to learn that ASM has a similar program, and that I was being considered to be part of it. As a longtime member of ASM, and as an editor for *Applied and Environmental Microbiology* for more than 10 years, I am strongly committed to ASM, and to the field of applied microbiology. While I consider myself a food microbiologist, I do have broad interests that include the application of mathematics and statistics to solving microbiological problems. While we have done research primarily in the area of food microbiology, we are also very interested in handwashing and cross-contamination broadly applied. I'm strongly committed to graduate students, and I currently serve as the Graduate Program Director for the Food Science graduate program. I'm also active in the graduate program in Microbial Biology at Rutgers. I run my lab with M.S. and Ph.D. students, with a complement of undergrads working for research credits and hourly wages.
Thomas J. Walsh, M.D., Ph.D. (hon), FIDSA, FAAM, FECMM (term: 7/1/17 through 6/30/19)
Waksman Foundation Lecturer

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ASM MEMBERSHIP AFFILIATION
Primary Division  F  Medical Mycology
Secondary Division  C  Clinical Microbiology

LECTURE TOPICS AND DESCRIPTIONS – Thomas J. Walsh, M.D., Ph.D. (hon), FIDSA, FAAM, FECMM

Advances in the Laboratory Diagnosis of Invasive Candidiases and Their Therapeutic Implications
1) Basic approaches for laboratory diagnosis of invasive candidiasis
2) Biomarkers (serum (13)–D-glucan, and PCR) new laboratory technology for detection of Candida spp. (MALDI--TOFF; T2 Biosystems)
3) CLSI methods, interpretive breakpoints, and ECVs
4) Therapeutic implications of Candida species
5) New antifungal agents

Emerging Fungal Pathogens and Diseases
1) New Candida species
2) Multidrug resistant moulds: Scedosporium, Lomentaspora, Fusarium
3) Cryptococcus gattii and its expanding impact
4) Evolving patterns in dimorphic mycoses: Sporothrix spp., Coccidioides spp., Blastomyces dermatitidis
5) Relevant changes in fungal nomenclature for clinical laboratories

Invasive Aspergillosis in Immunocompromised Patients
1) Aspergillus spp. and their epidemiological and clinical implications
2) Performance and interpretation of serum galactomannan, serum (13)–D-glucan, and PCR for laboratory diagnosis and therapeutic monitoring
3) Emergence of triazole resistant strains
4) CLSI methods, interpretive breakpoints, and ECVs
5) New antifungal agents
Diagnostic and Therapeutic Challenges of Mucormycosis
1) Dynamic interaction between clinicians and laboratorians
2) Rapid diagnostic procedures
3) New advances in laboratory diagnosis
4) Insights into pathogenesis and host defenses
5) New therapeutic approaches

Special Hosts and Invasive Mycoses: Critical Interactions between Laboratory and Bedside toward Better Patient Care
1) Pediatrics: Hematogenous Candida meningoencephalitis; neonatal candidemia
2) Primary Immunodeficiencies: Relationships between innate host defenses and fungal pathogens
3) Trauma and Burns: Expanding recognition of mucormycosis
4) AML and Hematopoietic Stem Cell Transplantation: Impact of antifungal prophylaxis
5) Solid Organ Transplantation: Emerging hospital acquired and community acquired mycoses

BIOGRAPHICAL SKETCH – Thomas J. Walsh, M.D., Ph.D. (hon), FIDSA, FAAM, FECMM
Thomas J. Walsh, M.D., Ph.D. (hon), FAAM, FIDSA is Professor of Medicine, Pediatrics, and Microbiology & Immunology at Weill Cornell Medicine of Cornell University and founding Director of the Transplantation-Oncology Infectious Diseases Program and the Infectious Diseases Translational Research Laboratory. He is an Adjunct Professor of Medicine of the University of Maryland School of Medicine, Sharp Family Foundation Scholar in Pediatric Infectious Diseases, and Investigator of Emerging Infectious Diseases of Save Our Sick Kids. He served with distinction as the Chief of the Immunocompromised Host Section of the Pediatric Oncology Branch of National Cancer Institute for 23 years. He was then recruited to build the first Transplantation-Oncology Infectious Diseases Program in Weill Cornell Medicine and New York Presbyterian Hospital. Dr. Walsh directs a combined clinical and laboratory research program dedicated to improving the lives and care of immunocompromised children and adults. The objective of the Program’s translational research is to develop new strategies for molecular diagnosis, immunopharmacology, pharmacokinetics / pharmacodynamics, treatment, and prevention of life-threatening invasive mycoses and other bacterial, fungal, and viral infections in immunocompromised children and adults. These objectives are achieved through laboratory investigations using parallel in vitro systems, and robustly predictive in vivo animal model systems, leading to phase-I, phase-II, and phase-III clinical trials. The Program’s current targeted laboratory investigations and clinical trials in medical mycology include invasive candidiasis, pulmonary aspergillosis, mucormycosis, fusariosis, and phaeohyphomycosis.

CV is available by request from adempsey@asmusa.org at ASM Headquarters

LECTURER’S PERSONAL STATEMENT – Thomas J. Walsh, M.D., Ph.D. (hon), FIDSA, FAAM, FECMM
My mission as a physician-scientist in Medical Mycology is to improve the lives of patients suffering from invasive mycoses through direct care, translational research, mentoring, and teaching. I have been teaching Medical Mycology for three decades. The ASM Distinguished Lecture Program provides a wonderful opportunity to share this teaching experience and
knowledge of Medical Mycology. As clinical microbiology laboratories and microbiologists encounter an ever expanding and challenging array of invasive fungal infections, the need for ongoing education and training is imperative for patient care, quality laboratory management, and basic understanding. During the past 32 years, I have taught Medical Mycology with the highest dedication to more than 6,000 medical students and graduate students in their core medical mycology courses in three universities. In further fulfillment of this educational mission, I have given numerous regional, national, and international lectures in Medical Mycology. In addition, I have mentored more than 180 trainees from 32 different countries, many of whom are recognized leaders in Medical Mycology and who continue the traditions of excellence in this vital field. As a member of the ASM since 1979, I have served as Division F Chair and Councilor, Member of the General Meeting Program Committee, Member of the Working Group for Coordination and Planning for Clinical Microbiology Sessions for the newly structured ASM General Meeting in 2011 and the Clinical Microbiology Task Force, 2010-2011, chair or convener of more than 20 educational or research roundtables, panels, symposia, or sessions, and the current lead author of ASM’s premier textbook of medical mycology, Larone’s *Medically Important Fungi, 6th edition*. In summary, I believe that my combined multidisciplinary clinical and laboratory expertise, broad knowledge in Medical Mycology, and dedication to mentoring and teaching an entire generation of professionals will be a powerful asset to the ASM Distinguished Lecture Program.