

Educate Your Doctors! Publicize the 20th Annual Lyme Conference

Help ensure that our doctors and others are educated about Lyme and tick-borne diseases.

The Lyme Disease Association & Columbia University will be holding their 20th CME scientific conference, *Lyme & Other Tick-Borne Diseases: 20th Annual Scientific Update for Clinicians & Researchers*, on September 21 & 22, 2019 in Philadelphia, PA at the Hilton Penn's Landing on the banks of the Delaware.

Please print [CONFERENCE FLYER](#) and distribute to places in your community such as:

▪ Doctor's

office

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[Pre-Conference Video](#)

LDA/Columbia Pre-Conference Video – 2019

Dr. Brian Fallon, Columbia University; Dr. Joanna Lyon, University of Maryland School of Pharmacy; Dr. Adrian Baranchuk, Queen's University; and Dr. George Chaconas, University of Calgary discuss topics of research to be presented at upcoming LDA/Columbia CME Conference September 21 & 22, 2019.

Smith, Patricia V.



Patricia V. Smith, BA

Pres, Lyme Disease Assoc., Inc.

Advisory Bd., Columbia Lyme & Tick-Borne Diseases
Research Center

Programmatic Panel, TBD, DoD Congressionally
Directed Medical Research Program

Conference Planning Com./Organizer

Jackson, NJ

Welcome/Overview of Lyme/Introductions

Patricia V. Smith, a Monmouth University graduate, is in her 20th year as President of the all-volunteer run national non-profit Lyme Disease Association, LDA and is a member of

Columbia University's Lyme & Tick-Borne Diseases Research Center Advisory Committee, member of the Food & Drug Administration's (FDA) PESP Partnership to promote avoidance of tick exposure, and member of the Tick IPM Working Group with federal and non federal members, from the IPM Institute of North America, to eradicate tick-borne diseases. She was appointed in 2016 as a member of the US Army Medical Research and Materiel Command (USAMRMC) Tick-Borne Disease Research Program (TBDRP) as a member of the Congressionally Directed Medical Research Program Programmatic Panel.

Ms. Smith is also former Chair, (NJ) Governor's Lyme Disease Advisory Council. She was EPA's PESP 2011 Lyme prevention conference session co-chair with CDC. In 2011 she presented a Lyme session to the New Jersey Education Association's Annual Meeting. She is a member & former officer of ILADS, International Lyme & Associated Diseases Society, a professional medical and research organization.

Ms. Smith is former President/12-year member of the Wall NJ Board of Education where she earned state board member-certified status. She is a former officer of Monmouth County School Boards Assn. and was a member of the Federal Relations Network for New Jersey School Boards Association/National School Boards Assn.

During her LDA presidency, Ms. Smith has led the effort to raise funds for researchers nationally, with more than 106 research grants awarded – research acknowledged in 42 scientific journals. She has organized 18 continuing medical education (CME) accredited Lyme scientific conferences for doctors and researchers with international faculty, held in different areas of the US, most jointly sponsored by Columbia University. She has spoken at many conferences on Lyme including those presented by the University of New Haven (CT) and the California Lyme Disease Association (now LymeDisease.org), Midcoast Maine Lyme Education and Support, Colorado Tick-Borne Awareness Association, and ILADS. She has

been a speaker at hundreds of public, school, business, & government events.

She led the LDA in its effort with a partner organization, to endow the Columbia Lyme & Tick-Borne Diseases Research Center in New York, which opened in 2007. She developed the ABCs of Lyme Disease pamphlet for parents and educators and also the LymeR Primer brochure now featuring 20 tick-borne diseases, the Tick Mark bookmark, and helped design Tick Awareness cards. More than 2.5 million education items have been distributed.

Ms. Smith has testified for and secured passage of state and federal bills for Lyme research and physician's right to treat. She has been invited to state capitals in CT, MA, MD, MN, NH, NJ, NY, PA, RI, to present oral testimony and education on Lyme and has provided written testimony in many others. Based on her written testimony, LDA was recently included in ground breaking Maine legislation as a website resource on Lyme disease on Maine's DPH website. She was invited to testify on two occasions before the NY Assembly Health Care Committee and also before the Rhode Island (Governor's) Lyme Disease Advisory Commission and has spoken before the California Lyme Disease Advisory Council. Over time, she has personally met with many State Health Commissioners and with Governors in NH, RI CT on Lyme issues and with then Governor Pataki's office on many occasions along with several NY state legislators. She has also presented before the Pennsylvania House of Representatives Majority Policy Committee and was an invited speaker for Lyme forums hosted by a member of the Massachusetts House of Representatives and the Majority Caucus Administrator for the Pennsylvania House of Representatives and the Minnesota State Senate Health Committee.

She has twice been invited to present to CDC Vector-Borne Diseases Division, Ft. Collins (2007, 2013); met with then CDC Director Dr. Julie Gerberding/5 Congressmen in DC; organized &

led a team that met with HHS Asst. Sec. of Health with CDC/NIH officials teleconferenced in; met with military leaders in DC; and briefed the Senate HELP Committee Members and House Subcommittee on Health. She met several times with US Army CHPPM/Public Health Command at Aberdeen Proving Grounds. She met in DC with the NIH Program Director and research coordinator and presented educational PowerPoints on Lyme to employees at the Environmental Protection Agency (2008, 2014), to the Dept. of Energy, and to Homeland Security in 2014. In 2014, she helped develop language for a federal bill on Lyme and led the nationwide effort which successfully passed the bill through the House. Ms. Smith spoke at a 2014 press conference with Senator Charles Schumer (NY) on the doxycycline shortage for Lyme patients. In 2012, she testified before the House Foreign Affairs Committee, Africa, Global Health & Human Rights Subcommittee on issues affecting Lyme patients. In 2013, she testified before the House Energy & Commerce Health Subcommittee on HR 610 to establish a federal Lyme & Tick-Borne Diseases Advisory Committee. She co-authored an article which was read into the Congressional Record on Lyme disease research priorities from the patient perspective. In 2015, she spoke at the American Association for the Advancement of Science in DC on patient research priorities. In 2016, she spoke before the Women in Government's annual conference. In 2016, she led the negotiations with House leadership for the Lyme language subsequently passed in the 21st Century Cures Act which creates a federal working group on tick-borne diseases with patient and advocates reps.

Chosen Jackson NJ's Chamber of Commerce 2008 Woman of the Year, she has also received commendation from the NJ legislature, a Special Congressional Recognition certificate from RI Cong. Langevin, and had a flag flown over the US Capitol by request of NJ Cong. Chris Smith in honor of her Lyme work. Ms. Smith helped to organize and presented at educational forums held by 3 congressmen (Langevin, Pitts, C. Smith). She has received awards from Dr. Brian Fallon,

Columbia, from various Lyme groups, and was given the Courage in Advocacy Award in 2015 from Connecticut based Lyme Connection and Focus on Lyme Excellence in Advocacy (AZ) award in 2017.

Other activities include providing input into a NJ law requiring teacher education for staff who teach students with Lyme disease, performing school in-services for educators on Lyme disease, and working with parents of students who are classified due to Lyme disease. Working with author Amy Tan, she created LDA's LymeAid 4 Kids, a fund for children with no health coverage for Lyme, a fund that has awarded \$338,400 for uninsured children to date.

Strandwitz, Philip



Philip Strandwitz, PhD

CEO and Co-founder, Holobiome, Inc.

Visiting Scholar, Antimicrobial Discovery Center

Department of Biology, Northeastern University

Boston, MA

<https://holobiome.org/>

The Gut-Brain-Axis – Potential Therapeutic Targets

Born in Wisconsin but brought to Boston by the allure of biotechnology, Philip is a microbial ecologist with expertise in the human microbiome, bacterial cultivation, and the gut-brain-axis. He received his Bachelor's in Microbiology from the University of La Crosse – Wisconsin, and his PhD from Northeastern University in Boston, MA, where he focused on cultivating unique bacteria from the human gut microbiota, as well as studying their ability to modulate neurotransmitters.

Philip's work has been published in top journals like Nature Microbiology, and he has presented at numerous scientific and industrial conferences, including those sponsored by the New York Academy of Science and BIO. He is now CEO at Holobiome, a gut-brain-axis microbiome company he co-founded, located in Kendall Square in Cambridge, MA. Here he has assembled and manages a team of leaders in neuroscience, microbiology, and drug development, with the goal to translate microbiome science into interventions to treat diseases of the nervous system, with planned expansion into other markets.

Conference Lecture Summary

Storch, Eric



Eric Storch, PhD

Professor and McIngvale Presidential Endowed Chair

Vice Chair & Head, Psychology

Menninger Department of Psychiatry and Behavioral Sciences

Baylor College of Medicine, Texas

<https://www.bcm.edu/healthcare/care-centers/psychiatry/services/obsessive-compulsive-disorder>

Obsessive Compulsive Disorder

Dr. Eric Storch is Professor and McIngvale Presidential Endowed Chair in the Menninger Department of Psychiatry and Behavioral Sciences at Baylor College of Medicine (BCM). He serves as Vice Chair and Head of Psychology, and oversees the

CBT for OCD program at BCM. Dr. Storch has received multiple grants from federal agencies for his research (i.e., NIH, CDC), is a Fulbright Scholar, and has published over 14 books and over 550 articles and chapters. He specializes in the nature and treatment of childhood and adult obsessive-compulsive disorder and related conditions, anxiety disorders, and anxiety among youth with autism.

Conference Lecture Summary

There is a well-documented link between obsessive-compulsive symptoms and various immunological conditions, where the latter confers additional burden above and beyond the illness alone. This talk will focus on what is known about the link between immune disorders including Lyme and obsessive-compulsive symptoms. Particular attention will be given to discussing pediatric autoimmune neuropsychiatric disorder associated with streptococcus as a potential model for understanding this linkage. Discussion will be provided regarding the nature of standard therapies as well as more immune-modulating approaches.

Sonenshine, Daniel E.



Daniel E. Sonenshine, PhD

Professor (Emeritus)

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How Climate Change Affects Range Expansion of Tick Vectors and

Spread of Tick-borne Disease in North America

Following my graduation (Ph. D) from the University of Maryland, I began teaching undergraduate and graduate courses, with a specialization in Parasitology and Medical Entomology. Over the course of more than 50 years studying ticks and tick-borne diseases, I studied the ecology of Rocky Mountain spotted fever and other vector-borne diseases. I also conducted studies on the internal anatomy and ultrastructure of different tick species, to understand how ticks find their hosts and blood feed. I carried numerous studies on the chemosensory functions of the Haller's organ, pedipalps and chelicerae, and the way in which they function in host (and mate) finding behavior, attachment to host skin and blood feeding. This work led to an understanding of the roles of diverse semiochemicals, especially pheromones, in facilitating host finding behavior, mating, and reproduction. These findings resulted in recognition of the novel features of pheromone-regulated mating behavior that enables ticks to discriminate their conspecific mates from those of other species. With these results in hand, my students and I were able to patent new technologies, e.g., tick decoys and tail-tag decoys, for disrupting mating and tick reproduction. I also conducted studies on the molecular biology of tick synganglion neuropeptides, neuropeptide receptors and neurotransmitters that regulate all the physiological processes essential for successful blood feeding, hemoglobin digestion, osmoregulation and reproduction. Transcriptomic studies of the male tick reproductive organs as well as the synganglion of hard ticks versus a soft tick enabled to offer a better understanding of how the remarkable life style differences between the two major tick families.

In addition to describing our findings in scientific articles, I also wrote the first complete, comprehensive 2-volume book, *Biology of Ticks*. This was followed more recently with the second edition, namely, the 2-volume, multi-authored and

Biology of Ticks. My 60 plus years of teaching, mentoring and research has led to more than 200 peer-reviewed articles. This enabled me to consult with the PI and associates concerning bioassays that showed that ticks are highly attracted to white and infrared light and how to discriminate the role of the tick's ocelli for recognizing white light and visual contrasts (i.e., shadows) versus the H0 for infrared detection. Moreover, my extensive experience in studies on the ecology of these ticks have enabled me to relate our findings of light/IR responses to better understanding of their value in host finding behavior in the natural environment. Therefore, in this proposal, we will extend the preliminary results with the evidence from both molecular and anatomical data that ticks in general use their Haller's organ for light detection, specifically in the IR range and compare and contrast it with the visual information provided by the ocelli for host finding behavior. We will also examine how these visible light and IR receptors work in association with chemosensory functions to drive the specific responses that enable ticks to recognize their hosts. We will also compare the responses of hard ticks versus soft ticks (*Ornithodoros turicata*). Finally, we will examine the regulation of the signal processes, based on our earlier work on the synganglion and endocrine system resulting from past NIH and NSF funding. I have extensive experience in both TEM and SEM procedures and in identifying diverse tissue, cellular and subcellular structures as demonstrated in my publications and my book, Biology of Ticks. My experience includes electrophysiological studies of sensory perception of olfactory and gustatory sensilla of these different tick organs as well as ultramicroscopic studies for distinguishing chemosensory versus mechanosensory neurons. More recently, I have gained training and experience in transcriptomics, sample collections meeting minimum standards for Next Gen sequencing, Gene Ontology mapping, bioinformatics skills for putative transcript identification, PCR and RT-PCR for individual gene expression in response to blood feeding in hard ticks versus a soft tick. I also have experience in gene silencing by RNAi

and recognition of phenotypical changes expected from successful gene silencing (e.g., silencing the ovary's vitellogenin receptor prevented tick egg production). I also have extensive experience in tick endocrine control of development (especially molting) and reproductive behavior, including understanding the potential synganglion and endocrine regulation of chemosensory functions. In addition to peer-reviewed publications on these subjects, I collaborated with Dr. Michael Roe in published the only book on tick biology, the 2-volume, 34-chapter *Biology of Ticks*. I have also patented the results of my basic science studies, including the tick decoy and most recently the semi-autonomous tick killing robot (Tickbot). I attribute my success to collegial collaboration with scientific colleagues, offering technical experience, insights into vector biology, data interpretation and scientific writing as well as mentoring students and/or junior faculty. I also had a long and fruitful collaboration with Dr. R. Michael Roe and other scientists at the Department of Entomology at North Carolina State University (>20 years) leading to numerous peer reviewed publications, invited presentations at national and international meetings, a major book and, especially important, training and mentoring Ph.D students and post-docs.

Conference Lecture Summary

Ticks are the major vectors of most disease-causing agents to humans, companion animals and wildlife. Moreover, ticks transmit a greater variety of pathogenic agents than any other blood-feeding arthropods. Ticks have been expanding their geographic ranges in recent decades largely due to climate change. Furthermore, tick populations in many areas of their past and even newly established localities have increased in abundance. These dynamic changes present new and increasing severe public health threats to humans, livestock and companion animals in areas where they were previously unknown

or were considered to be of minor importance. Here in this review, the geographic status of four representative tick species are discussed in relation to these public health concerns, namely, the American dog tick, *Dermacentor variabilis*, the lone star tick, *Amblyomma americanum*, the Gulf Coast Tick, *Amblyomma maculatum* and the black-legged tick, *Ixodes scapularis*. *D. variabilis* has expanded its range northward into southern Canada, where it has been reported to be established in parts of Ontario, Saskatchewan, Manitoba and Nova Scotia. *A. americanum* northward expansion has progressed to the extent that established population are now reported as far north as Michigan, Pennsylvania, almost all of New York state, and most of New England states almost to the Canadian border. Both biotic and abiotic factors that may influence future range expansion and successful colony formation in new habitats are discussed.

Sołoski, Mark J.



Mark J. Sołoski, PhD

Professor of Medicine

Co-Director for Basic Research, Lyme Disease
Research Center

Johns Hopkins School of Medicine
Baltimore, MD

HopkinsLyme.org

Host Immune Response in Lyme Borreliosis

Mark J. Sołoski, Ph.D., is currently a Professor of Medicine in the Division of Rheumatology at the Johns Hopkins University School of Medicine and he holds joint appointments in the School of Medicine's Departments of Pathology and

Molecular Biology and Genetics as well as the Department of Molecular Microbiology and Immunology in the School of Public Health. He is the Co-Director for Basic Research for the Johns Hopkins Lyme Disease Research Center. Dr. Soloski received his Ph. D. in Microbiology from Rutgers, the State University of New Jersey and then completed post-doctoral training in Immunology at the University of Texas Health Science Center at Dallas, Southwestern Medical School prior to joining the faculty at the Johns Hopkins School of Medicine in 1983. The overarching theme of his research is understanding how infection can lead to long-term persistent symptoms. At this time, working with John Aucott, M.D. the Director of the Lyme Center at Hopkins, he is focused on understanding how the immune system contributes to the symptoms and severity of Human Lyme disease. He is very active and excited about the teaching of students, at all levels, about how the immune system evolved, how it protects us from infection and how it can contribute to disease.

Conference Lecture Summary

Lyme disease is an inflammatory illness initiated by infection with *Borrelia burgdorferi* following a bite from an infected tick. Over the last four decades, the number of Lyme disease cases has risen sharply and it is now the most common vector-borne disease in the United States with over 300,000 cases each year. Symptoms of early Lyme disease can range from erythema migrans (EM) alone to systemic toxicity with signs of disseminated infection. Further, a number of patients with undetected and untreated early Lyme disease will develop late-onset musculoskeletal or neurological symptoms. While the acute infection and late-onset disease can be controlled by antibiotic therapy, in a subset of patients, arthritis with inflammation can be antibiotic-refractory. In addition, 10-20% of patients treated for early Lyme disease develop Post-Treatment Lyme Disease Syndrome (PTLDS), a condition with an

unknown pathophysiological etiology that may have an immune component. The rising incidence of Lyme disease as well as the complexity of disease outcomes demands a deeper understanding of the immune-mediated process triggered by infection with *B. burgdorferi*.

In this presentation the current knowledge of the host immune response to *B. burgdorferi* in human Lyme disease will be reviewed with particular attention to how variation in host immunity may play a role in driving persistent symptoms versus return to health. Data from the study of the Johns Hopkins Slice cohort will also be presented that will address our hypothesis that the nature of the immune response plays a key role in the range of pathophysiological outcomes in human Lyme disease.

Novak, Peter



Peter Novak, MD, PhD

Division Chief, Autonomic Neurology

Director, Autonomic Laboratory

Department of Neurology, Brigham and Women's Faulkner Hospital

Assistant Professor of Neurology, Harvard Medical School

https://physiciandirectory.brighamandwomens.org/details/12831/peter-novak-neurology-boston-south_weymouth

Neurological correlates of Post Treatment Lyme Disease Syndrome

Peter Novak, MD, PhD is the Chief of the Division of Autonomic Neurology and Director of the Autonomic Laboratory at Brigham and Women's Hospital. He is a board-certified neurologist and a board-certified autonomic specialist. He is a member of American Academy of Neurology, American Autonomic Society and a member of Autonomic Board of United Council for Neurologic Subspecialties (UCNS).

He graduated from medical school in Bratislava, Slovakia and completed his neurology residency at the Ohio State University. He also completed postdoctoral studies focusing on cardiovascular and autonomic research at Charles University (Prague), University of Montreal, McGill University (Montreal) and Mayo Clinic. He has special interests in autoimmune small fiber and autonomic neuropathies, orthostatic syndromes, multiple system atrophy and neurologic complications of Lyme disease. He has written over 70 papers and presented at numerous conferences.

Conference Lecture Summary

Lyme disease is a transmittable tick-borne infection caused by the spirochete *Borrelia burgdorferi*. Neurologic sequelae of Lyme disease, termed Lyme neuroborreliosis, occur in 10-15% of patients with untreated Lyme disease. Persistent symptoms despite standard antibiotic therapy of Lyme disease are reported in 10% to 36% of patients. These symptoms, when prolonged for a period of 6 months or longer, are referred to as post-treatment Lyme disease syndrome (PTLDS). Typical symptoms of PTLDS include widespread pain, fatigue, and cognitive disturbances. PTLDS results in considerable impairment of quality of life. The origin of PTLDS symptoms is unclear. Potential mechanisms include direct cytotoxicity by the spirochete, the presence of neurotoxic mediators occurring during host-pathogen interaction, autoimmune reactions or genetic predisposition. The main problem in PTLDS research is

lack of the objective biomarker. In our study, we analyzed 10 PTLDS patients (all had history of Lyme disease satisfying CDC criteria) and patients all had evidence of small fiber neuropathy, dysautonomia and abnormal cerebral blood flow. The study suggest that SFN appears to be associated with PTLDS and may be responsible for certain sensory symptoms. Reduced orthostatic CBFv can be associated with cerebral hypoperfusion and may lead to cognitive dysfunction in PTLDS.

Naviaux, Robert K.



Robert K. Naviaux, MD, PhD

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Metabolomic Features of Acute and Chronic Lyme Disease—Early Results from the UCSD Lyme-ME/CFS Comparison Study

Dr. Naviaux is the founder and co-director of the Mitochondrial and Metabolic Disease Center (MMDC), and Professor of Medicine, Pediatrics, Pathology, and Genetics at UCSD, where he directs a core laboratory for metabolomics. He is the co-founder and a former president of the Mitochondrial Medicine Society (MMS), and a founding associate editor of the journal *Mitochondrion*. He is an internationally known expert in human genetics, inborn errors of metabolism, metabolomics, and mitochondrial medicine. Dr. Naviaux is the discoverer of the cause of Alpers syndrome—the oldest Mendelian form of

mitochondrial disease—and the developer of the first DNA test to diagnose it. His lab also discovered the first mitochondrial DNA (mtDNA) mutations that cause genetic forms of autism and the metabolic features of the cell danger response (CDR). He directed the first FDA-approved clinical trial to study the safety and efficacy of the antipurinergic drug suramin as a new treatment for autism spectrum disorder (ASD). His lab has developed new methods in metabolomics and environmental toxicology that have shown that many complex chronic disorders like ASD and chronic fatigue syndrome (ME/CFS) have a metabolic signature that can be used in diagnosis and lead to fresh insights to treatment. Information about Naviaux Lab research can be found on the web at: naviauxlab.ucsd.edu.

Conference Lecture Summary

The symptoms of post-treatment Lyme disease syndrome (PTLDS) and myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS) are very similar. Without knowledge of the triggering event, it is not possible to distinguish the two disorders on purely clinical grounds. Both are chronic fatiguing illnesses that lead to long-term pain and disability. Both disorders can display significant post-exertional malaise, disrupted and unrefreshing sleep, headaches, brain fog, autonomic dysfunction with or without postural orthostatic tachycardia syndrome (POTS) and small fiber polyneuropathy (SFPN), GI abnormalities, and joint and muscle pain, with or without fibromyalgia. In this study, we will compare the metabolomic signature of PTLDS to ME/CFS, and to Borreliosis associated with acute Lyme disease. In addition, we will present the first evidence for and against the role of environmental pesticide and other toxicant exposures in regulating innate immune and cell danger responses in patients with PTLDS and controls.

Maloney, Elizabeth L.



Elizabeth L. Maloney, MD

President, Partnership for Tick-Borne Diseases Education

Family Practice Physician

Wyoming, MN

Conference Facilitator and Conference Planning Committee

Dr. Elizabeth L. Maloney is the President of Partnership for Tick-Borne Diseases Education, a non-profit organization providing online and live evidence-based continuing medical education programming and materials on tick-borne diseases for physicians and other healthcare professionals. She is a graduate of the University of Minnesota Medical School and its affiliated Family Medicine residency. Dr. Maloney also acts as a consultant to government agencies and private organizations. She recently served on the Pathogenesis, Transmission and Treatment subcommittee of the federally mandated Tick-borne Diseases Working group. She frequently speaks to the general public on tick-borne diseases, emphasizing the need for primary and secondary prevention.

www.partnershipfortickbornediseases.org

Conference Lecture Summary