

# Current NIAID Research focused on Persistent Illness Attributed to Lyme Disease

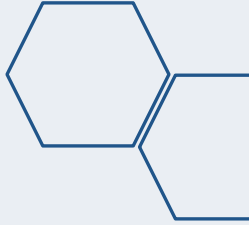
NADINE BOWDEN, *Program Officer for Lyme Disease and Other Borrelioses*  
National Institute of Allergy and Infectious Diseases  
National Institutes of Health

April 22, 2024

# R01s funded through RFA AI-22-046

---

| Contact PI     | Title                                                                                                                                             |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| John Aucott    | Determinants of Post-Treatment Phenotypes in Lyme Disease                                                                                         |
| Linden Hu      | Auto-antibodies as predictive markers for Post treatment Lyme Disease Syndrome                                                                    |
| Brandon Jutras | The natural release of unusual peptidoglycan fragments drives persistent Lyme disease symptoms in susceptible hosts                               |
| Cherie Marvel  | Neuroimaging and blood markers in post treatment Lyme disease with persistent neurologic symptoms                                                 |
| Michal Tal     | Unlocking serology's secrets: harnessing novel immune biomarkers to predict Lyme disease progression and recovery                                 |
| Rafal Tokarz   | Genetic basis for persistence of <i>Borrelia burgdorferi</i>                                                                                      |
| Neal Woodbury  | Discovery of early immunologic biomarkers for risk of PTLDS through machine learning-assisted broad temporal profiling of humoral immune response |

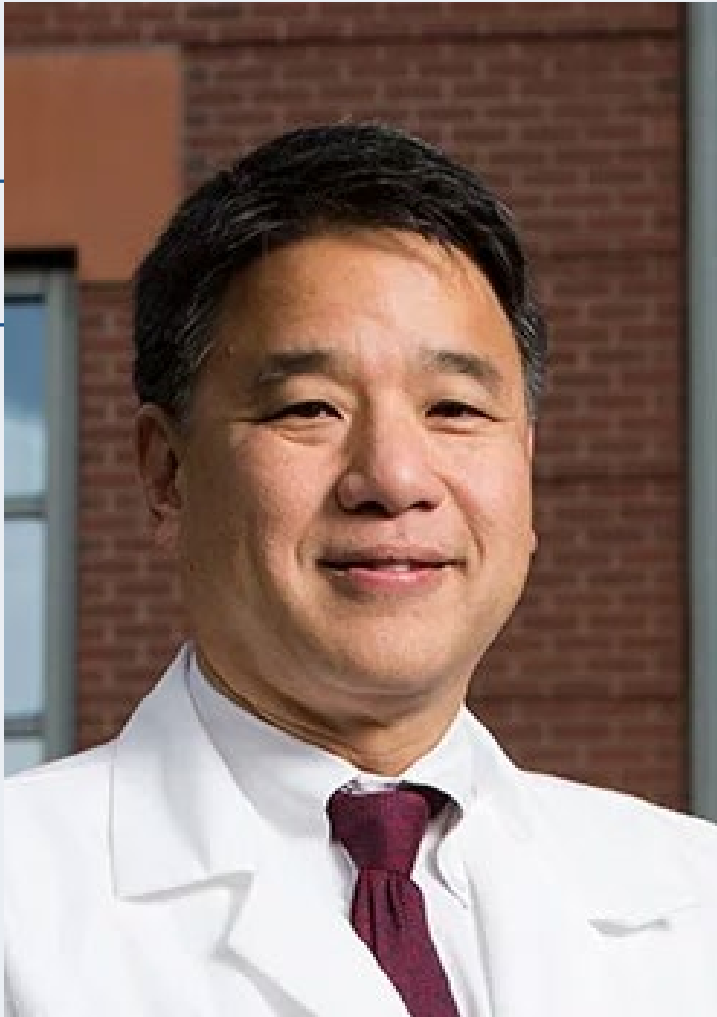
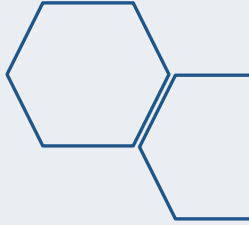


**John Aucott, M.D.**

Johns Hopkins University

# Determinants of post-treatment phenotypes in Lyme disease

- Overarching goal is to uncover clinical, immunologic, and metabolic determinants of post-treatment Lyme disease (PTLD) and its underlying symptom phenotypes
- A specific goal is to develop a clinical assessment score to identify patients at increased risk of developing PTLD
- Possible future impacts include new therapeutic strategies to treat PTLDS and interventions to prevent PTLDS

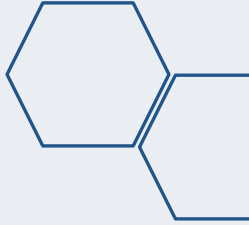


**Linden Hu, M.D.**

**Tufts University Boston**

# Auto-antibodies as predictive markers for post treatment Lyme disease syndrome

- Overarching goal is to explore development of anti-lipid/ phospholipid antibodies during Lyme disease and their potential role in PTLDS
- A specific goal is to test a new animal model for PTLDS that shares similarities with a fibromyalgia animal model
- Possible future impacts include development of better diagnostic tests and increased understanding of pathogenesis of PTLDS

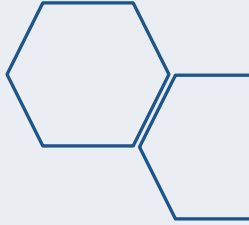


**Brandon Jutras, Ph.D.**

Virginia Polytechnic Institute and State University\*

# The natural release of unusual peptidoglycan fragments drives persistent Lyme disease symptoms in susceptible hosts

- The overarching goal is to determine what about the cell wall makes patients sick and define strategies to improve Lyme disease patient health when antibacterial therapies have failed
- A specific goal is to assess if targeted monoclonal antibody therapy is a viable approach to treat antibiotic refractory Lyme arthritis
- Possible future impacts include new ways to treat patients when conventional options have failed and a better understanding of the drivers of patient symptomology

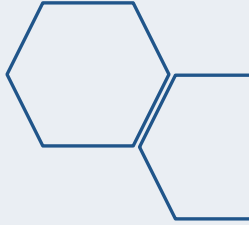


**Cherie Marvel, Ph.D.**

Johns Hopkins University

# Neuroimaging and blood markers in post treatment Lyme disease with persistent neurologic symptoms

- The overarching objective is to study the underlying mechanism of neurologic symptoms in PTLD
- A specific goal is to test the hypothesis that changes in the brain, detectable by imaging, reflect and adaptive response and predict better outcomes after treatment of early Lyme disease
- Possible future impacts include new diagnostic, prognostic and therapeutic approaches to the cognitive manifestations of PTLD

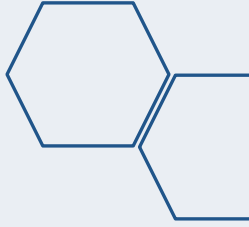


**Michal Tal**

**Massachusetts Institute of Technology**

# Unlocking serology's secrets: harnessing novel immune biomarkers to predict Lyme disease progression and recovery

- The overarching objective is to identify a serology biomarker that accurately predicts patient outcomes after treatment with antibiotics
- A specific goal is to test a new immune profiling technique developed by the group called FLIP to profile immune reactions of patients in different cohorts including those with persistent symptoms
- Possible future impacts include using FLIP to guide enrollment into clinical trials and understand the optimal antibody mix for responding to infection

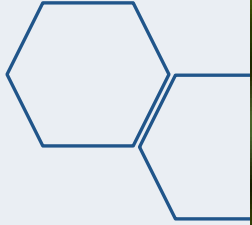


**Rafal Tokarz, Ph.D.**

Columbia University health Sciences

# Genetic basis for persistence of *Borrelia burgdorferi*

- The overarching goal is to understand the role of bacterial genetics and host immune response in the development of PTLDS
- A specific goal is to identify the major immunoreactive epitopes of *B. burgdorferi* found in the sera and CNS fluid of patients with PTLDS
- Possible future impacts include identifying mechanistic triggers of spirochete persistence and greater insight into the immune response of patients with PTLDS



**Neal Woodbury, Ph.D.**

Arizona State University – Tempe Campus

# Discovery of early immunologic biomarkers for risk of PTLDS through machine learning-assisted broad temporal profiling of humoral immune response

- Overarching goal is to predict and validate which *B. burgdorferi* and human protein antigens are associated with development of PTLDS
- A specific goal is to use machine learning to evaluate all circulating patient antibodies, not just those that react with known antigenic *B. burgdorferi* targets
- Possible future impacts include development of better diagnostic tests and generation of hypotheses that can be tested in disease models

Looking for mor information? Visit [reporter.nih.gov](https://reporter.nih.gov)

### Advanced Projects Search

Fiscal Year ?

Active Projects

Current FY is 2024

Principal Investigator (PI) ?

PI Names or Profile IDs, semicolon ";" separated

Organization ?

Enter at least 3 characters to search

Agency/Institute/Center ?

☒ Admin ☐ Funding

Project Number/Application ID ?

Format: 5R01CA012345-04/ 8515397, semicolon ";" separated

Reset

Search

Looking for additional search fields? [Click here to view All Search Fields](#)

Opportunity Number: RFA-AI-22-046