Updates from the Northeast Regional Center for Excellence in Vector-Borne Diseases
Our Leadership Team

- Cornell University, Department of Entomology (Center Hub)
  - Laura Harrington, PhD (Principal Investigator, Program Director)

- Connecticut Agricultural Experiment Station
  - Theodore Andreadis, PhD (Co-Principal Investigator)

- New York State Department of Health
  - Bryon Backenson, MS (Co-Principal Investigator)

- Wadsworth Center, NYSDOH
  - Laura Kramer, PhD (Co-Principal Investigator)

- Columbia University, Department of Ecology, Evolution & Environmental Biology
  - Maria Diuk-Wasser, PhD (Co-Principal Investigator)
Our Regional Partners

- Connecticut Department of Public Health
- Cornell College of Veterinary Medicine
- Cornell College of Agriculture and Life Sciences
- Earth Institute, Columbia University
- Calder Center, Fordham University
- Johns Hopkins University
- Maine Medical Center Research Institute
- New Jersey Mosquito Control
- New York City Department of Mental Health & Hygiene
- New York State Integrated Pest Management
- Pennsylvania State University
- Rutgers University
- Suffolk County (NY) Health Department
- SUNY at Albany
- University of Rhode Island Department of Plant Sciences & Entomology
- Vermont Department of Health
- Yale School of Public Health

Over 60 partners across more than 20 organizations in the Northeast
Our Goals

- **Train a cadre of public health entomologists** with the knowledge and skills required to rapidly detect, prevent and respond to vector-borne disease threats in the US.

- **Build effective communities of practice** via collaborations between academic communities and public health organizations at federal, state, and local levels for vector borne disease surveillance, response and prevention.

- To conduct applied research to **develop and validate effective vector-borne disease prevention and control tools and methods** necessary to anticipate and respond to disease outbreaks.
Structure of Our Network

Public Health Practice
- Vector Surveillance
- Community Prevention Resources

Enhanced Training
- Academic Programs
- Continuing Professional Education

Applied Research
- Vector Biology & Behavior
- Evidence-Based Control

Improved Lives in Our Communities
Academic Training Programs

- **Master of Science in Entomology at Cornell University**
  - Concentration: Medical and Veterinary Entomology
  - Program Focus: Vector Biology
  - Incoming class Fall 2018

- **Master of Public Health Program at Cornell University**
  - Concentration in Infectious Disease Epidemiology
  - Co-instruction of students
  - Placement for practicum and capstone experiences
MS in Entomology

- **Foundation** in skills needed to work in fields of
  - Public health vector-borne disease surveillance
  - Vector surveillance and control
- **Development of new courses**
  - Introduction to Disease Vectors
  - Vector-Borne Disease Control Lab
  - Vector-Borne Disease Modeling
  - Topical Seminars
- **Public Health training**
  - Epidemiology
  - Public Health Foundations
  - Public Health Ethics and Leadership

10-week Internship

**Topical Areas**
- Vector biology & modeling
- Vector surveillance
- Vector control
- Insecticide resistance
- Repellents
- Big data management
- Novel strategies for vector control
- Public health messaging
- Public perceptions of vector-borne disease
Professional Training Efforts

- **NEVBD Needs Assessment & Workforce Interviews**
  - **Training needs:**
    - vector/pathogen identification
    - vector surveillance techniques
    - vector ecology and behavior
    - enhanced communication
  - **Training delivery:** short courses, online webinars with targeted content

- **2018 Plans:**
  - Explore development of physician-targeted content
  - Development of targeted webinars on focal public health topics

- **2018 Vector Biology Boot Camp**
  - Louis Calder Center, May 22-24, 2018
  - Accepting applications until March 2, 2018 (visit our website to apply)
  - Course curriculum in development
## 2018 Vector Biology Boot Camp

<table>
<thead>
<tr>
<th>Arthropod Surveillance</th>
<th>Review of arthropod biology and behavior, major regional diseases and emerging threats, and key components of a vector surveillance program</th>
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</thead>
<tbody>
<tr>
<td>Arthropod Collection &amp; Testing</td>
<td>Hands-on exercises in monitoring and collecting ticks and mosquitoes. Review of best practices for processing field samples and how they are subsequently tested for pathogens.</td>
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<tr>
<td>Taxonomy &amp; Identification</td>
<td>Hands-on exercises in the use of taxonomic keys for arthropod identification</td>
</tr>
<tr>
<td>Vector Control</td>
<td>Review of current vector control strategies for ticks and mosquitoes</td>
</tr>
<tr>
<td>Data Interpretation &amp; Management</td>
<td>Overview of best practices for data entry and management; use of data to understand trends and inform program strategies; and best practices for displaying data to stakeholders</td>
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http://neregionalvectorcenter.com/training-career-resources
Applied Research and Public Health Challenges for the Northeast

- Invasive species range expansion
- Existing and emerging pathogens
- Need for new surveillance tools
- Need for new control strategies
- New diagnostics for human and arthropod samples
- Funding shortfalls to support applied research

Asian Tiger Mosquito  Black legged tick or ‘deer tick’  Lone Star tick
Research Cluster 1: Evaluation of Novel Trapping & Surveillance Methods

2018 Priorities:

1. Efficacy comparisons between existing traps and modified traps
   - Use of modified lures on BG traps

2. Continuation of larval surveys and citizen science efforts

3. Review of regional capacity for active tick surveillance
Research Cluster 2: Predicting Current & Future Human Risk of Infection

- **Focus Area 1**: modeling habitat suitability for *Ae. albopictus* and human risk of infection with *Ae. albopictus*-borne pathogens
- **Focus Area 2**: Predicting the geographic spread of multiple tick-borne diseases in the Northeast and the US
- **Focus Area 3**: Effects of climate change on the spread of multiple vectors in the Northeast (CEEID and IRI)

**2018 Priorities**:
1. Continue development of TickApp
2. Continue development of climate models for key pathogens and vectors
3. Analysis of passive tick surveillance data
   - Tick testing labs across the region
   - Companion animal and wildlife passive surveillance
4. Explore standardization of surveillance methodologies to enhance regional-scale modeling efforts

Maria Diuk-Wasser
Research Cluster 3: Vector-Pathogen Interactions & Vector Competence

2018 Priorities:

1. Baseline competence of Northeast Ae. albopictus strains
2. Impact of temperature variations on tick and mosquito vectorial capacity
3. Ae. triseriatus and La Crosse virus
4. Standardization of protocols across project teams
Research Cluster 4: Field Biology & Climate, Diapause and Overwintering

- Climate and diapause for *Ae. albopictus* in the Hudson Valley
- Overwintering survival for *I. scapularis* and *A. americanum*
- Overwintering survival for *Ae. albopictus*
- Blood feeding genomic analysis

2018 Priorities:

1. Blood feeding and foraging behavior of *Ae. albopictus*
2. Continuation of tick overwintering studies in CT and ME
3. Lone Star tick overwintering and range expansion
4. Continuation of *Ae. albopictus* diapause study in Lower Hudson Valley
5. Host interactions of juvenile ticks

Goudarz Molaei
Research Cluster 5: Chemical Control, Resistance Monitoring & Management

- Testing new and integrative control strategies
- Region-wide resistance monitoring and mapping

2018 Priorities:

1. Enhance partnerships with key organizations
2. Conduct resistance testing of ticks & mosquitoes
3. Resistance mapping in Northeast
4. Assess regional capacity for routine seasonal mosquito and tick control
5. Testing of tick and mosquito products in the field, including cost & efficacy evaluations
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