

Tse-Yu Chen

Postdoctoral Associate

Yale University

Section of Infectious Diseases, Department of Internal Medicine

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Education

PhD, Entomology and Nematology

August 2021

University of Florida, United States

Dissertation title: The role of autophagy in dengue virus infection in *Aedes aegypti*

Advisor: Dr. Chelsea T. Smartt

MSc, Biochemistry and Molecular Biology

August 2012

National Yang Ming University, Taiwan

Thesis title: Immune-associated signal in *Aedes* with dengue virus infection

Advisor: Dr. Ping-Hui Tseng

BSc, Entomology

June 2010

National Chung Hsing University, Taiwan

Research Experience

Postdoctoral Associate

2021 – present

Section of Infectious Diseases, Department of Internal Medicine,

Yale University School of Medicine, New Haven, United States

Advisor: Dr. Erol Fikrig

- Investigate the role of the adiponectin receptor in Zika virus infection in *Aedes aegypti* using both *in vitro* and *in vivo* assays.
- Develop a protocol to isolate live mosquito midgut cells and proceed to single-cell sequencing to identify the midgut cell response to virus infection.
- Evaluate the immune factor Galectin-1 and its impact on Zika virus infection in *Ae. aegypti*.
- Study interactions between mosquito salivary proteins and the host to identify potential vaccine candidates.
- Build the AEPIn (*Aedes aegypti* Ecto-Protein Interactome) yeast display system, which contains most *Ae. aegypti* secreted and membrane proteins for screening protein-protein interactions.

Graduate Research Assistant

2017 – 2021

Florida Medical Entomology Laboratory, Department of Entomology and Nematology,
University of Florida, Vero Beach, United States

Advisor: Dr. Chelsea T. Smartt & Dr. Cynthia Lord

- Worked on the Center for Arthropod Management Technologies (CAMTech) project to investigate the sub-lethal effects of spatial repellents and commonly used insecticides on mosquito vectorial capacity.
- Handled Dengue virus, Zika virus and West Nile virus infection *in vitro* and *in vivo*.
- Evaluated diabetes serum impacts on fecundity in mosquito.

Student temporary employment

2017 – 2021

Florida Medical Entomology Laboratory, Department of Entomology and Nematology,
University of Florida, Vero Beach, United States

Advisor: Dr. Yoosook Lee

- Analyzed RNA-Seq data.
- Developed genomic library preparation for Florida *Aedes aegypti* population genomics projects.

Advisor: Dr. Dongyoung Shin

- Investigated the permethrin resistance mechanisms in *Aedes aegypti*.
- Identified the kdr mutation and detoxification gene expression in permethrin resistant *Aedes aegypti* population.

Research Assistant

2012

Institute of Molecular and Genomic Medicine, National Health Research Institutes, Taiwan

Advisor: Dr. Chun-Hong Chen

- Assessment of Dengue virus titer in *Aedes aegypti* MicroRNA based RNAi system.

Adjunct Research Assistant

2010 – 2012

Institute of Biochemistry and Molecular Biology, National Yang Ming University, Taiwan

Advisor: Dr. Ping-Hui Tseng

- Examined JNK phosphorylation impact on virus titer in *Aedes aegypti*.
- Investigated the Toll-like receptor 4 and the downstream signal pathway in mammalian system.

Peer- Reviewed Publication

1. **Chen, T.-Y.**, Bozic, J., Mathias, D. & Smartt C.T. (2023). Immune-related transcripts, microbiota and vector competence differ in dengue-2 virus-infected geographically distinct *Aedes aegypti* populations. *Parasites Vectors* 16, 166. doi.org/10.1186/s13071-023-05784-3
2. Kosinski1, K.J., Lee, Y., Romero-Weaver, A.L., **Chen, T.-Y.**, Collier, T.C., Wang, X., Mathias, D.K. & Buckner E.A. (2022). Two novel single nucleotide polymorphisms in the voltage-gated sodium channel gene identified in *Aedes aegypti* mosquitoes from Florida. *JFMCA* 69, 21-28. doi.org/10.32473/jfmca.v69i1.130622.
3. **Chen, T.-Y.** & Smartt, C.T. (2021). Activation of the autophagy pathway decreases dengue virus

- infection in *Aedes aegypti* cells. *Parasites Vectors* 14, 551. doi.org/10.1186/s13071-021-05066-w.
4. **Chen, T.-Y.**, Lee, Y., Wang, X., Mathias, D., Caragata, E.P. & Smartt, C.T. (2021). Profiling transcriptional response of Dengue-2 virus infection in midgut tissue of *Aedes aegypti*. *Front. Trop. Dis* 2:708817. doi: 10.3389/ftd.2021.708817.
 5. Kondapaneni, R., Malcolm, A.N., Vazquez, B.M., Zeng, E., **Chen, T.-Y.**, Kosinski, K.J., Romero-Weaver, A. L., Giordano, B.V., Allen, B., Riles, M.T., Killingsworth, D., Campbell, L.P., Caragata, E.P. & Lee, Y. (2021). Mosquito control priorities in Florida – Survey results from Florida Mosquito Control Districts. *Pathogens*. 10, 947. doi.org/10.3390/pathogens10080947.
 6. Kelly, E.T., Mack, L.K., Campos, M., Grippin, C., **Chen, T.-Y.**, Romero-Weaver, A.L., Kosinski, K.J., Brisco, K.K., Collier, T.C., Buckner, E.A., Campbell, L.P., Cornel, A.J., Lanzaro, G.C., Rosario-Cruz, R., Smith, K., Attardo, G.M. & Lee, Y. (2021). Evidence of local extinction and reintroduction of *Aedes aegypti* in Exeter, California. *Front. Trop. Dis*. 2:703873. doi:10.3389/ftd.2021.703873.
 7. **Chen, T.-Y.**, Vorsino, A. E., Kosinski, K. J., Romero-Weaver, A. L., Buckner, E. A., Chiu, J. C., Lee, Y. (2021). A Magnetic-Bead-Based Mosquito DNA Extraction Protocol for Next-Generation Sequencing. *J. Vis. Exp.* 170, e62354, doi:10.3791/62354.
 8. **Chen, T.-Y.**, Smartt, C.T. & Shin, D. (2021). Permethrin resistance in *Aedes aegypti* affects aspects of vectorial capacity. *Insects*. 12, 71. doi.org/10.3390/insects12010071.
 9. Smartt, C.T., Stenn, T.M.S., **Chen, T.-Y.**, Teixeira, M.G., Queiroz, E.P., Souza Dos Santos, L., Queiroz, G.A.N., Ribeiro Souza, K., Kalabric Silva, L., Shin, D. & Tabachnick, W.J. (2017). Evidence of Zika virus RNA fragments in *Aedes albopictus* field collected eggs from Camaçari, Bahia, Brazil. *J. Med. Entomol.* 54(4):1085-1087.

Peer- Reviewed Book Chapters and Review Article

1. Marín-López, A., Raduwan, H., **Chen, T.-Y.**, Utrilla-Trigo, S., Wolfhard, D.P. & Fikrig, E. (2023). Mosquito salivary proteins and arbovirus infection: from viral enhancers to potential targets for vaccines. *Pathogens*, 12, 371. doi.org/10.3390/pathogens12030371.
2. Schmidt, H., Kirstein, O.D., **Chen, T.-Y.**, Campbell, L.P., Collier, T.C. & Lee, Y. (2021). The population genomics of *Anopheles gambiae* species complex: progress and prospects. In: *Population Genomics*. Springer, Cham. doi.org/10.1007/13836_2021_92.
3. Lee, Y., Saavedra-Rodriguez, K., **Chen, T.-Y.**, Campbell, L.P. & Smartt, C. T. (2021). The population genomics of *Aedes aegypti*: progress and prospects. In: *Population Genomics*. Springer, Cham. doi.org/10.1007/13836_2021_93.
4. Smartt, C. T., Shin, D. & **Chen, T.-Y.** (2016). Chapter 3.1: Forced Salivation of Infected *Aedes aegypti* and *Culex quinquefasciatus* into capillary tubes containing Immersion oil for Detection of Mosquito-borne Virus. *Methods in Aedes Research*. Bei resources.

Manuscript submitted or under preparation

1. Marin-Lopez,A., Huck, J.D., Esterly, A.T., Azcutia, V., Rosen, C., Garcia-Milian, R., Vidal-Pedrola, G., Raduwan, H., **Chen, T.-Y.**, Arora, G., Halene, S., Shaw, A.C., Palm, N.W., Parkos, C.A., Thangamani, S., Ring, A.M., & Fikrig, E.. The human CD47 checkpoint is targeted by an immunosuppressive *Aedes aegypti* salivary factor to enhance arboviral skin infectivity. **Revision in Science Immunology.**
2. **Chen, T.-Y.**, Raduwan, H., Marin-Lopez,A., Cui, Y., & Fikrig, E.. Single cell sequencing reveals Zika virus targets polyploid enterocytes and enteroendocrine cells of the *Aedes aegypti* midgut. **Submitted to Cell Reports.**
3. **Chen, T.-Y.**, Marin-Lopez,A., Raduwan, H., Jesse, H., & Fikrig, E.. The role of adiponectin receptor-like protein in Zika virus infection in *Aedes aegypti*. **Prepare to submit before June 1st.**

Presentations

Invited speaker

1. **Chen, T.-Y.** (2023) The role of adiponectin receptor-like protein in Zika virus infection in *Aedes aegypti*. Yale ID/Rheum Research Conference.

Oral presentation

1. **Chen, T.-Y.**, Marin-Lopez,A., Raduwan, H., Jesse, H., & Fikrig, E. (2023). The role of adiponectin receptor-like protein in Zika virus infection in *Aedes aegypti*. Entomological Society of America 2023 Annual Meeting.
2. **Chen, T.-Y.**, Bozic, J., Mathias, D. & Smartt, C. T. (2021) Immune-related transcripts, microbiota and vector competence differ in dengue infected geographically distinct *Aedes aegypti* populations. Entomological Society of America 2021 Annual Meeting.
3. Bozic, J., Wang, X., **Chen, T.-Y.**, Stenn, T.M.S., Smartt, C. T. & Mathias, D. (2021) Impact of fungal isolates on mosquito longevity, arboviral competence, and innate immunity. Entomological Society of America 2021 Annual Meeting.
4. **Chen, T.-Y.**, Smartt, C. T., Lord, C. C., Alto, B. & Allan, S. (2021) Sub-lethal Effects of Spatial Repellents and Commonly Used Insecticides on Mosquito Vectorial Capacity. Center for Arthropod Management Technologies Spring Meeting.
5. **Chen, T.-Y.** & Smartt, C. T. (2020) Activation of the autophagy pathway affects Dengue virus infection in *Aedes aegypti*. Entomological Society of America 2020 Annual Meeting.
6. **Chen, T.-Y.**, Smartt, C. T. & Shin, D. (2020) Permethrin resistance in *Aedes aegypti* affects aspects of vectorial capacity. Entomological Society of America 2020 Annual Meeting.
7. **Chen, T.-Y.**, Smartt, C. T., Lord, C. C., Alto, B. & Allan, S. (2020) Sub-lethal Effects of Spatial Repellents and Commonly Used Insecticides on Mosquito Vectorial Capacity. Center for Arthropod Management Technologies Fall Meeting.
8. **Chen, T.-Y.** & Smartt, C. T. (2020) Activation of the autophagy pathway affects Dengue virus infection in *Aedes aegypti*. Second Annual John Beidler Florida Medical Entomology Laboratory

Graduate Student Symposium.

9. **Chen, T-Y.**, Smartt, C. T., Lord, C. C., Alto, B. & Allan, S. (2020) Sub-lethal Effects of Spatial Repellents and Commonly Used Insecticides on Mosquito Vectorial Capacity. Center for Arthropod Management Technologies Spring Meeting.
10. **Chen, T-Y.** & Smartt, C. T. (2019) Characterize the role of autophagy in Dengue virus infection in *Aedes aegypti* mosquitoes. Entomological Society of America 2019 Annual Meeting.
11. **Chen, T-Y.**, Smartt, C. T., Lord, C. C., Alto, B. & Allan, S. (2019) Sub-lethal Effects of Spatial Repellents and Commonly Used Insecticides on Mosquito Vectorial Capacity. Center for Arthropod Management Technologies Spring Meeting.
12. **Chen, T-Y.** & Smartt, C. T. (2018) Characterize the role of autophagy and apoptosis in Dengue virus infection in *Aedes aegypti* mosquitoes. 1st Annual John Beidler Florida Medical Entomology Laboratory Graduate Student Symposium.

Poster presentation

1. Lord, C. C., **Chen, T-Y.**, Light, J., Henneberg, A., & Smartt, C. T. (2020) Simulated impacts on vectorial capacity from resistance and exposure to insecticides and repellents in *Aedes aegypti*. Entomological Society of America 2020 Annual Meeting.
2. **Chen, T-Y.** & Smartt, C. T. (2020) Immune pathway differences affect the vector competence in Dengue infected *Aedes aegypti* populations. The 2020 International Branch Virtual Symposium.
3. **Chen, T-Y.**, Smartt, C. T., Lord, C. C., Alto, B. & Allan, S. (2019) Sub-lethal Effects of Spatial Repellents and Commonly Used Insecticides on Mosquito Vectorial Capacity. Center for Arthropod Management Technologies Meeting. St. Louis, Missouri.
4. Donaldson, T., **Chen, T-Y.**, Lanzana, K., Smartt, C. T. & McCutcheon, G. (2019) Wnt Inhibitor and Diazepam Binding Inhibitor Effects in *Culex quinquefasciatus* Mosquitoes. ERN Conference in STEM. Washington, D.C.
5. **Chen, T-Y.** & Smartt, C. T. (2019) Characterize the role of autophagy in Dengue virus infection in *Aedes aegypti* mosquitoes. Emerging Pathogens Institute's Research Day, Gainesville, Florida
6. Smartt, C. T., Shin, D., Kang, S., **Chen, T-Y.** & Tabachnick T. J. (2019) *Culex quinquefasciatus* Say (Diptera: Culicidae) from Florida transmitted Zika virus. Emerging Pathogens Institute's Research Day, Gainesville, Florida
7. **Chen, T-Y.** & Tseng, P-H. (2012) Immune-Associated Signaling in Mosquito with Dengue Virus Infection. 26th Joint Annual Conference of Biomedical Science, Taipei, Taiwan.

Honors and Awards

- 2022 John A. Mulrennan, Sr. Outstanding PhD Student Award, University of Florida
- 2021 Florida Medical Entomology Lab (FMEL) fellowship, University of Florida
- 2020 Dean's Match fellowship, University of Florida
- 2020 Medical, Urban, and Veterinary Entomology (MUVE) Student Travel Awards, Entomological Society of America

- 2019 Florida Medical Entomology Lab (FMEL) fellowship, University of Florida
- 2018 Dean's Match fellowship, University of Florida
- 2017 Florida Medical Entomology Lab (FMEL) fellowship, University of Florida

Reviewing Activities

- Scientific Reports
- mSphere
- Insects
- The Journal of the Florida Mosquito Control Association

Teaching Experience

- ENY 4592 Mosquito Biology, 2018 Fall, University of Florida. **Teaching Assistant**
Assisted students with questions, graded exams and mini assays, reviewed the material, and provided constructive feedback.
- ENY 6593 Advanced Mosquito Biology, 2018 Fall, University of Florida. **Teaching Assistant**
Assisted students with questions, reviewed the material, and offered constructive feedback.

Mentoring Experience

1. Ane Martinez Castillo, Exchange PhD student, CIC bioGUNE, Basque Research & Technology Alliance (BRTA), Spain. 2022.
2. Sergio Utrilla-Trigo, Exchange PhD student, Centro de Investigación en Sanidad Animal (CISA), Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (INIA-CSIC), Spain. 2022.
3. David Wolfhard, Exchange MS student, Faculty of Engineering Sciences, Institute of Pharmacy and Molecular Biotechnology, Germany. 2022.
4. Sierra Schlupe, MS student, Department of Entomology, University of Florida, USA. 2019-2021.
John A. Mulrennan, Sr. Outstanding MS Student Award.
5. Ashley Nicole Malcolm, Undergraduate student, University of Florida, USA. 2020-2021.
6. Brian Vazquez, Undergraduate student, University of Florida, USA. 2020-2021.
7. Rishi Kondapaneni, Undergraduate student, University of Florida, USA. 2020-2021.
8. Eric Zeng, Undergraduate student, University of Florida, USA. 2020-2021.
9. Kiana Lebeau, Undergraduate student, Indian River State College, USA. 2019-2020.
10. Elaine Ibrahim, Undergraduate student, Indian River State College, USA. 2019.
11. David Spencer, Undergraduate student, Indian River State College, USA. 2018.
12. Tanesha Donaldson, Undergraduate student, Claflin University, USA. 2018.
13. Kevin Pierre, Undergraduate student, University of Florida, USA. 2017.

Extension Activity

- 2023 Letters to a Pre-Scientist, Isbell Middle School, Santa Paula, CA
- 2022 Bugs and the diseases we get from them - Skype a Scientist Live
- 2022 Insects around you - Skype a Scientist, Parkside Elementary, Morrisville, NC
- 2020 Forensic Entomology - Skype a Scientist, South Cobb High School, Austell, GA
- 2020 STRAM program: Science, Gifford, FL
- 2019 6th Annual Indian River Lagoon Science Festival, Fort Pierce, FL
- 2019 Linking Together to Get STEAMed, Boys and Girls Club, Fort Pierce, FL
- 2019 “A Celebration of Insects” event, Heathcote Botanical Gardens, FL
- 2019 Indian River County STEAM Fest, Vero Beach, FL
- 2018 5th Annual Indian River Lagoon Science Festival, Fort Pierce, FL
- 2018 “A Celebration of Insects” event, Heathcote Botanical Gardens, FL
- 2009 Exhibition of Insect Behavior, Taichung, Taiwan
- 2006 Exhibition of Aquatic Insect, Taichung, Taiwan

Professional Service

Elected

- 2020 – present Taiwanese Entomologists around the World organization committee
- 2020 – present Taiwanese Entomologist Association Meeting organizer
- 2018 – 2021 Chair of Annual John Beidler Florida Medical Entomology Laboratory Graduate Student Symposium
- 2018 – 2021 Graduate students’ representative for FMEL graduate student committee

Volunteer

- 2022 Project judge for New Haven Science Fair
- 2021 FMEL Diversity, Equity, and Inclusion (DEI) formatting committee
- 2019 ESA 2019 Annual Meeting volunteer

Membership

- Entomological Society of America
- Taiwanese Entomologists around the World organization- Organizer
- Yale Postdoctoral Association (YPA)-Member

Languages

Native: Mandarin and Taiwanese.

Full professional proficiency: English.