

Hyeogsun Kwon, Ph.D.

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PROFESSIONAL SUMMARY

I am a devoted mosquito vector biologist with a strong commitment to identifying and discovering crucial mosquito molecules that play a pivotal role in restricting the development of *Plasmodium* parasites within mosquito hosts. Recognizing the profound impact of malaria infections, which kill over half a million people annually, I strive to develop innovative interventions aimed at limiting the transmission of malaria parasites and effectively controlling mosquito populations. Throughout my professional journey, I have been fortunate to engage in training both undergraduate and graduate students, as well as collaborating with esteemed world-class scientists. These opportunities have further enriched my expertise and reinforced my passion for making a significant contribution to public health.

EDUCATION

<u>Year</u>	<u>Degree</u>	<u>Institution</u>
2013	Ph.D. in Entomology	Texas A&M University, College Station, TX.
2004	M.S. in Biological Sciences	Western Illinois University, Macomb, IL.
2001	B.S. in Agricultural Biology	Korea University, Seoul, South Korea

PROFESSIONAL APPOINTMENTS

<u>Year</u>	<u>Appointment</u>
2019-present	Research Scientist Department of Plant Pathology, Entomology and Microbiology, Iowa State University, Ames, IA.
2015-2018	Postdoctoral Research Associate Department of Entomology, Iowa State University, Ames, IA.
2013-2015	Postdoctoral Research Associate Department of Entomology, Texas A&M University, College Station, TX.
1999-2001	Teaching and Research Assistant Department of Clinical Laboratory Science, College of Health Science, Korea University, Seoul, South Korea

RESEARCH EXPERIENCE

Research Scientist (*Principal investigator: Dr. Ryan C. Smith*)

- Contribution of phagocytic hemocytes to Zika and Dengue virus dissemination in *Aedes aegypti*

- Effect of non-steroidal anti-inflammatory drugs on mosquito survival, reproduction and immunity in *Anopheles gambiae*.
- Roles of PGE2 signaling in Malpighian tubules in *Anopheles gambiae*.
- Classification of mosquito hemocytes by analyzing transcript expression using single cell RNA-sequencing and RNA-FISH analyses.
- The effect of additional blood feeding on development of *Plasmodium* parasites.
- Investigation of differences in molecular mechanisms underlying the production of nitrogen metabolites between naïve blood fed and *Plasmodium* infected blood fed mosquitoes.
- Functional characterization of putative prostaglandin E2 receptor in anti-*Plasmodium* immunity in *Anopheles gambiae*.

Postdoctoral Research Associate (*Principal investigator: Dr. Ryan C. Smith*)

- Identification of putative immune molecules relevant to hemocytes and further characterization of their roles in cellular immune defenses during the course of malaria parasite development in *Anopheles gambiae*.

Postdoctoral Research Associate (*Principal investigator: Dr. Patricia V. Pietrantonio*)

- Identification of putative prostaglandin receptors and its functional characterization in cellular response to bacterial challenges in *A. aegypti* and *Manduca sexta*.
- Investigation of gustatory behavior mediated by the leucokinin receptor in female *Aedes aegypti* mosquito in the presence of mosquito kinin analogs.

Ph. D. Graduate Student (*Adviser: Dr. Patricia V. Pietrantonio*)

- Molecular characterization of calcitonin receptor-like receptor 1 (GPCRCAL1) expressed in the Malpighian tubules and hindgut of *Aedes aegypti* and investigation of functional roles of the GPCRCAL1 in diuresis and myotropic action in excretory organs.

Ph. D. Graduate Student (*Adviser: Dr. Jon S. Miller*)

- Investigation of roles of eicosanoids in plasmotocyte spreading in *Manduca sexta* and evaluating morphological phenotypes of plasmotocyte upon bacterial challenges.

M.S. Graduate Student (*Adviser: Dr. Richard O. Musser*)

- Functional characterization of glucose oxidase antibacterial activity in salivary glands of *Helicoverpa zea*

RESEARCH SUPPORT

COMPLETED RESEARCH SUPPORT

- | | |
|-------------------|--|
| 03/01/19-12/31/20 | NIH-R21AI44705: “Eicosanoid regulation of mosquito innate immunity.” The goal of this project is to understand how prostaglandin E2 (PGE2) signaling in concert with PGE2 receptor contributes to mosquito innate immunity in the malaria mosquito <i>Anopheles gambiae</i> . Smith (PI), (\$420,750) |
| 09/01/18-09/01/19 | Postdoctoral Seed Grant Award: “Characterization of a mosquito prostaglandin (PG) receptor and its role in immune function.” This project aims to characterize a putative prostaglandin E2 receptor (PGE2R) and understand the integral roles of PGE ₂ signaling in shaping anti- <i>Plasmodium</i> immunity in the malaria mosquito <i>Anopheles gambiae</i> . Kwon (PI), (\$1500) |

PAST RESEARCH GRANT APPLICATIONS (SCORE)

- 07/01/23-06/30/28 **NIH NIAID-RO1:** *“Mosquito hemocyte-mediated contributions to malaria parasite killing.”*
Smith and **Kwon (CO-PI)**, (\$3,671,163), Impact score: 25
- 07/01/23-06/30/28 **NIH NIAID-RO1:** *“Influence of PGE2 signaling on insect innate immune function.”* Resubmission
Smith and **Kwon (CO-PI)**, (\$2,924,708), Impact score: 29
- 07/01/23-06/30/28 **NIH NIAID-RO1:** *“Influence of PGE2 signaling on insect innate immune function.”* Resubmission
Smith and **Kwon (CO-PI)**, (\$2,924,708), Impact score: 53
- 01/15/23-12/31/23 **AMCARF:** *“Development of a non-steroidal anti-inflammatory drug (NSAID) for mosquito control”* **Kwon (PI)**, (\$52,859)
- 09/01/22-08/31/27 **NIH NIAID-RO1:** *“Mosquito hemocyte-mediated contributions to malaria parasite killing.”* Resubmission
Smith, Beck (CO-PI) and **Kwon (CO-PI)**, (\$1,728,046), Impact score: 49
- 09/01/22-08/31/27 **NIH NIAID-RO1:** *“Role of prostaglandin E2 on insect innate immune function.”* Smith, and **Kwon (CO-PI)**, (\$1,955,836), Impact score: 26
- 04/01/22-03/31/27 **NIH NIAID-RO1:** *“Role of prostaglandin E2 on insect immune function.”*
The primary goal of the proposed study is to identify and characterize molecules influenced by PGE2 signaling and determine the impact of PGE2 immune dysregulation on pathogen and host survival. Smith and **Kwon (CO-PI)**, (\$1,912,500), Impact score: 50
- 04/01/22-03/31/27 **NIH NIAID-RO1 (resubmission; revision application):** *“Mosquito hemocyte-mediated contributions to malaria parasite killing.”*
The goal of this proposal is to define the mechanism of mosquito immune cells, which promote *Plasmodium* ookinete, oocyst and sporozoite killing in *Anopheles gambiae*. Smith and **Kwon (CO-PI)**, (\$2,724,044) Impact score: 22
- 09/01/21-08/31/26 **NIH NIAID New Innovator Awards (DP2):** *“The use of aspirin for mosquito control.”*
The primary goal of the proposed study is to understand metabolic mechanisms underlying aspirin action to development, gustatory perception and reproduction in the malaria mosquito *Anopheles gambiae*, with the aim of developing new mosquito control strategies. **Kwon (PI)**, (\$1,500,000), Impact score: NA
- 07/01/21-06/30/26 **NIH NIAID-RO1:** *“Mosquito hemocyte-mediated contributions to malaria parasite killing.”*
The goal of this proposal is to define the mechanism of mosquito immune cells, which promote *Plasmodium* ookinete, oocyst and sporozoite killing in

PEER-REVIEW PUBLICATIONS

[22 to date; Citation: 1242 taken from Google Scholar]

1. George-Rafael Samantsidis, **Hyeogsun Kwon**, Megan Wendland, Catherine Fonder, Ryan C Smith. (2025) TNF signaling mediates cellular immune function and promotes malaria parasite killing in the mosquito *Anopheles gambiae*, PLoS Pathg, 21, 7, e1013329. <https://doi.org/10.1371/journal.ppat.1013329>, **co-first author**, IF: 5.5
2. David R Hall, Rebecca M Johnson, **Hyeogsun Kwon**, Zannatul Ferdous, S Viridiana Laredo-Tiscareño, Bradley J Blitvich, Doug E Brackney, Ryan C Smith. (2025) Mosquito immune cells enhance dengue and Zika virus infection in *Aedes aegypti*, Nat. Commun, 16, 5891. <https://doi.org/10.1038/s41467-025-61139-9>, **co-first author**, IF: 14.7
3. **Hyeogsun Kwon**, Ryan C Smith. (2025) Protocol to chemically deplete phagocytic hemocytes in *Anopheles gambiae* using clodronate liposomes, STAR protoc, 6, 2, 103819. <https://doi.org/10.1016/j.xpro.2025.103819> IF: 1.3
4. Hannah J. Loghry, **Hyeogsun Kwon**, Ryan C Smith, Noelle A Sondjaja, Sarah J Minkler, Sophie Young, Nicolas J Wheeler, Mostafa Zamanian, Lyric C Bartholomay, Michael J Kimber. (2023) Extracellular vesicles secreted by *Brugia malayi* microfilariae modulate the melanization pathway in the mosquito host, Sci.Rep, 13, 8778. <https://doi.org/10.1038/s41598-023-35940-9> IF: 4.99
5. **Hyeogsun Kwon** and Ryan C Smith. (2022) *Anopheles gambiae* actively metabolizes uric acid following *Plasmodium* infection to limit malaria parasite survival, Front. Physiol, 12, 821869. <https://doi.org/10.3389/fphys.2021.821869>. IF: 4.13
6. **Hyeogsun Kwon**, David R Hall, Ryan C Smith. (2021) Identification of a prostaglandin E2 receptor that regulates mosquito oenocytoid immune cell function in limiting bacteria and parasite infection, Front. Immunol, 12, 680020. <https://doi.org/10.3389/fimmu.2021.680020>. IF: 6.43
7. **Hyeogsun Kwon**, Mubasher Mohammed, Oscar Franzén, Johan Ankarklev, Ryan C Smith. (2021) Single-cell analysis of mosquito hemocytes identifies signatures of immune cell sub-types and cell differentiation, eLife, 10:e66192. DOI: [10.7554/eLife.66192](https://doi.org/10.7554/eLife.66192). IF: 8.14
8. **Hyeogsun Kwon**, Maria L Simões, Rebekah A Reynolds, George Dimopoulos, Ryan C Smith (2021) Additional feeding reveals differences in immune recognition and growth of *Plasmodium* parasites in the mosquito host, mSphere, 6(2): e00136-21. <https://doi.org/10.1128/mSphere.00136-21>. IF: 3.68
9. Jyothisna Ramesh Kumar, Jessica P. Smith, **Hyeogsun Kwon**, and Ryan C. Smith (2021) Use of clodronate liposomes to deplete phagocytic immune cells across dipteran species, Front Cell Dev Biol, 9, 627976. <https://doi.org/10.3389/fcell.2021.627976>. IF: 5.87
10. Rebekah A Reynolds, **Hyeogsun Kwon**, Thiago Luiz Alves e Silva, Janet Olivas, Joel Vega-Rodriguez, Ryan C. Smith. (2020) The 20-hydroxyecdysone agonist, halofenozide, promotes

anti-*Plasmodium* immunity in *Anopheles gambiae* via the ecdysone receptor, Sci Rep, 10:21084. <https://doi.org/10.1038/s41598-020-78280-8>. IF: 4.38

11. Rebekah A. Reynolds, **Hyeogsun Kwon**, Ryan C. Smith. (2020) 20-hydroxyecdysone (20E) primes innate immune responses that limit bacteria and malaria parasite survival in *Anopheles gambiae*, mSphere, 5(2): e00983-19. <https://doi.org/10.1128/mSphere.00983-19>. IF: 3.68
12. **Hyeogsun Kwon**, Yunlong Yang, Sunil Kumar, Dae-Weon Lee, Prati Bajracharya, Travis L. Calkins, Younggyun Kim, Patricia Pietrantonio. (2020) characterization of the first insect prostaglandin (PGE2) receptor: MansePGE2R is expressed in oenocytoids and lipoteichoic acid (LTA) increases transcript expression. Insect Biochem Mol Biol, 117:103290. <https://doi.org/10.1016/j.ibmb.2019.103290>. IF: 4.71
13. **Hyeogsun Kwon**, Ryan C. Smith. (2019) Inhibitors of eicosanoid biosynthesis reveal that multiple lipid signaling pathways influence malaria parasite survival in *Anopheles gambiae*, Insects, 10(10), 307. <https://doi.org/10.3390/insects10100307>. IF: 2.14
14. **Hyeogsun Kwon**, Ryan C. Smith. (2019) Chemical depletion of phagocytic immune cells in *Anopheles gambiae* reveals dual roles of mosquito hemocytes anti-*Plasmodium* immunity, Proc Natl Acad Sci USA, 116(28): 14119-14128. <https://doi.org/10.1073/pnas.1900147116>. IF: 11.2
15. **Hyeogsun Kwon**, Benjamin R. Arends, and Ryan C. Smith. (2017) Late-phase immune responses limiting oocyst survival are independent of TEP1 function yet display strain specific differences in *Anopheles gambiae*, Parasit Vectors, 10(1), 369. <https://doi.org/10.1186/s13071-017-2308-0>. IF: 3.04
16. **Hyeogsun Kwon**, Moutaz Ali Agha, Ryan C. Smith, Ronald J. Nachman, Frédéric Marion-Poll, and Patricia V. Pietrantonio. (2016) Leucokinin mimetic elicits aversive behavior in mosquito *Aedes aegypti* (L.) and inhibits the sugar taste neuron, Proc Natl Acad Sci USA, 133(25): 6880-6885. [doi:10.1073/pnas.1520404113](https://doi.org/10.1073/pnas.1520404113). IF: 11.2
17. Monika Gulia-Nuss et al., (2016) Genomic insights into the *Ixodes scapularis* tick vector of Lyme disease, Nat. Commun 7: 10507. [doi:10.1038/ncomms10507](https://doi.org/10.1038/ncomms10507). IF: 14.92
18. **Hyeogsun Kwon**, Patricia V. Pietrantonio. (2013) Calcitonin receptor 1 (*AedaeGPCRCAL1*) hindgut expression and direct role in myotropic action in females of the mosquito *Aedes aegypti* (L.). Insect Biochem Mol Biol, 43(7): 588-93. [doi:10.1016/j.ibmb.2013.03.005](https://doi.org/10.1016/j.ibmb.2013.03.005). IF: 4.71
19. **Hyeogsun Kwon**, Hsiao-Ling Lu, Michael T. Longnecker, Patricia V. Pietrantonio. (2012) Role in diuresis of a calcitonin receptor (GPCRCAL1) expressed in a distal-proximal gradient in renal organs of the mosquito *Aedes aegypti* (L.), PLoS ONE 7, e50374. <http://dx.doi.org/10.1371/journal.pone.0050374>. IF: 3.24
20. Aishwarya Soorash, **Hyeogsun Kwon**, Robert Taylor, Patricia Pietrantonio, Michelle Pine and Christie M. Sayes. (2011) Surface functionalization of silver nanoparticles: novel applications for insect vector control, ACS applied Materials & interfaces. 3(10):3779-87, DOI: 10.1021/am201167v. IF: 9.23
21. **Hyeogsun Kwon**, David W. Stanley and Jon S. Miller (2007) Bacterial challenge and eicosanoids act in plasmatocyte spreading, Entomol Exp Appl, 124: 285-292. DOI: 10.1111/j.1570-7458.2007.00582.x. IF: 1.99

22. Richard O. Musser, **Hyeogsun Kwon**, Spencer A. Williams, C. James White, Michael A. Romano, Scott M. Holt, Shay Bradbury, Judith K. Brown, and Gary W. Felton. (2005) Evidence that caterpillar labial saliva suppresses infectivity of potential bacterial pathogen, Arch Insect Biochem Physiol 58: 138-144. DOI: 10.1002/arch.20031. IF: 1.70

PREPRINT PUBLICATIONS

23. Md Abdullah Al Baki, Shabbir Ahmed, **Hyeogsun Kwon**, David Hall, Ryan Smith, Yonggyun Kim. (2020) Aspirin inhibition of prostaglandin synthesis impairs egg development across mosquito taxa, bioRxiv. <https://doi.org/10.1101/2020.07.17.208389>.
24. David R Hall, Rebecca M Johnson, **Hyeogsun Kwon**, Zannatul Ferdous, S Viridiana Laredo-Tiscareno, Bradley J Blitvich, Doug E Brackney, Ryan C Smith. (2024) Mosquito immune cells enhance dengue and Zika virus dissemination in *Aedes aegypti*, bioRxiv. <https://doi.org/10.1101/2024.04.03.587950>
25. George-Rafael Samantsidis, **Hyeogsun Kwon**, Megan Wendland, Catherine Fonder, Ryan C Smith. (2024) TNF signaling mediates cellular immune function and promotes malaria parasite killing in the mosquito *Anopheles gambiae*, bioRxiv. <https://doi.org/10.1101/2024.05.02.592209>
26. Enzo Mameli, George-Rafael Samantsidis, Raghuvir Viswanatha, **Hyeogsun Kwon**, David R. Hall, Matthew Butnaru, Yanhui Hu, Stephanie E. Mohr, Norbert Perrimon, Ryan C Smith. (2024) A genome-wide CRISPR screen in *Anopheles* mosquito cells identifies essential genes and required components of clodronate liposome function, bioRxiv. doi: <https://doi.org/10.1101/2024.09.24.614595>
27. Olivia V Goldman et al., (2025) Mosquito Cell Atlas: A single-nucleus transcriptomic atlas of the adult *Aedes aegypti* mosquito, bioRxiv. doi: [10.1101/2025.02.25.639765](https://doi.org/10.1101/2025.02.25.639765)

CONFERENCE PRESENTATIONS

ORAL PRESENTATION (Presenter underlined)

- 2021 **Hyeogsun Kwon**, Prostaglandin E2 signaling regulates oenocytoid immune function that is essential for establishing *Anopheles gambiae* innate immunity, 70th American Society of Tropical Medicine and Hygiene, November 20th, Virtual Annual Meeting.
- 2019 Rebekah Reynolds, **Hyeogsun Kwon**, Ryan Smith. 20-hydroxyecdysone (20E) primes *An. gambiae* innate immune response to bacteria and malaria parasites, 68th American Society of Tropical Medicine and Hygiene, November 22nd, National Harbor, MD.
- 2019 **Hyeogsun Kwon**, Ryan Smith. Chemical depletion of phagocytic immune cells in *Anopheles gambiae* provides new insights into hemocyte immune functions and malaria parasite killing, Entomological Society of America Annual Meeting, November 19th, St. Louis, MO.
- 2019 **Hyeogsun Kwon**, Ryan Smith, Identification of a prostaglandin E2 signaling pathway in *Anopheles gambiae* that mediates phenoloxidase activity and limits *Plasmodium* oocyst survival, Entomological Society of America Annual Meeting, November 19th, St. Louis, MO.
- 2019 **Hyeogsun Kwon**, Rebekah Reynolds, Maria Simões, George Dimopoulos, Ryan Smith. Additional blood-feeding reveals differences in oocyst survival and growth between

Plasmodium species in *Anopheles gambiae*, Entomological Society of America Annual Meeting, November 18th, St. Louis, MO.

- 2018 **Hyeogsun Kwon**, Ryan Smith, Contribution of PGE2 signal pathway to anti-*Plasmodium* immunity in *Anopheles gambiae*, Fall International Conference of Korean Society of Applied Entomology, October 25th, Pyeongchang, South Korea.
- 2018 Rebekah Reynolds, **Hyeogsun Kwon**, Ryan Smith. 20-hydroxyecdysone (20E) activates mosquito cellular immunity and limits *Plasmodium* ookinete survival, Entomological Society of America Annual Meeting, November 12th, Vancouver, BC, Canada.
- 2018 **Hyeogsun Kwon**, Ryan Smith. Contribution of phagocytic granulocytes to anti-*Plasmodium* immunity in *Anopheles gambiae*, North Central Branch, Entomological Society of America, March 20th, Madison, WI.
- 2018 Rebekah Reynolds, **Hyeogsun Kwon**, Ryan Smith. 20-hydroxyecdysone (20E) induces priming of mosquito immunity and limits malaria parasite infection in *Anopheles gambiae*, North Central Branch, Entomological Society of America, March 20th, Madison, WI.
- 2017 **Hyeogsun Kwon**, Ryan Smith. Chemical depletion of granulocytes reveals contributions of hemocytes to anti-*Plasmodium* immunity, 66th American Society of Tropical Medicine and Hygiene, November 6th, Baltimore, MD.
- 2013 Patricia Pietrantonio, **Hyeogsun Kwon**, Ronald Nachman. A kinin analog elicits food aversion in females of *A. aegypti* apparently through a sensory function of the kinin receptor in legs, selected by EMBO (European molecular biology organization) July 2013, Kolimbari, Crete, "Conference on molecular and population biology of mosquitoes."
- 2011 **Hyeogsun Kwon**, Patricia Pietrantonio. Cloning, immunolocalization and functional analysis of calcitonin receptor-like receptor 1 (AaegGPCAL1; Diuretic Hormone 31 (DH31) receptor) in females of mosquito *Aedes aegypti* (Diptera: Culicidae), Entomological Society of America Annual Meeting, November 14th, Reno, NV.

POSTER PRESENTATION (Presenter underlined)

- 2021 **Hyeogsun Kwon**, David R Hall, Ryan C Smith. Prostaglandin signaling mediates oenocytoid immune cell lysis and limits *Plasmodium* oocyst survival in *Anopheles gambiae*, World Malaria Day Symposium, April 25th, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD.
- 2019 **Hyeogsun Kwon**, Rebekah Reynolds, Maria Simões, George Dimopoulos, Ryan Smith. Additional blood-feeding reveals differences in oocyst survival and growth between *Plasmodium* species in *Anopheles gambiae*, 68th American Society of Tropical Medicine and Hygiene, November 21th, National Harbor, MD.
- 2018 Rebekah Reynolds, **Hyeogsun Kwon**, Ryan Smith. Additional blood-feeding after *Plasmodium* infection reduces malaria parasite survival in the mosquito host, 67th American Society of tropical Medicine and Hygiene, October 30th, New Orleans, LA.
- 2008 Cymon N. Kersch, **Hyeogsun Kwon**, Patricia Pietrantonio. Cloning and sequencing the calcitonin receptor-like receptor 3 (AaegGPCal3) from female mosquitoes of *Aedes aegypti*

(L.) (Diptera: Culicidae), Entomological Society of America Annual Meeting, November, 17th, Reno, NV.

2006 **Hyeogsun Kwon**, Jon S. Miller. Eicosanoid influence plasmatocyte spreading behavior in the tobacco hornworm, *Manduca sexta*, in response to immune challenge, North Central Branch, Entomological Society of America, March 28th, Bloomington, IL.

2005 **Hyeogsun Kwon**, Spencer Williams, Katie Berger, Richard O. Musser. Evidence that a caterpillar labial saliva enzyme suppresses infectivity of potential bacterial pathogen, Entomological Society of America Annual Meeting, Section Display Presentations, Section Ce. Insect Pathology and Microbial Control, December 18th, Ft. Lauderdale, FL.

2005 Richard O. Musser, **Hyeogsun Kwon**, Spencer Williams. Evidence that a caterpillar labial saliva enzyme suppresses infectivity of potential bacterial pathogen, North Central Branch, Entomological Society of America Annual Meeting, March 22th, West Lafayette, IN.

INVITED SEMINARS

2022 *Anopheles gambiae* actively metabolizes uric acid following *Plasmodium* infection to limit malaria parasite survival, Parasitology and Vector-Borne Disease Group meeting in Iowa State University

2021 The use of non-steroidal anti-inflammatory drugs (NSAIDs) for mosquito control, Parasitology and Vector-Borne Disease Group meeting in Iowa State University.

2019 Identification of a prostaglandin E2 signaling pathway in *Anopheles gambiae* that mediates phenoloxidase activity and limits *Plasmodium* oocyst survival, Parasitology and Vector-Borne Disease Group meeting in Iowa State University.

2017 Mosquito immune cells mediate innate immune responses to malaria parasite infection Biological Science Department, Western Illinois University, Macomb, IL.

2017 Mosquito hemocyte contributions to malaria parasite infection. Entomology Department, Iowa State University, Ames, IA.

2014 Susceptibility status of Asian citrus psyllid (ACP) population to malathion in Weslaco, Texas. Vector Biology Group, the Department of Entomology in Texas A&M University.

2013 A kinin analog elicits food aversion in females of *Aedes aegypti* through a sensory function of the kinin receptor in legs. Vector Biology Group, the Department of Entomology in Texas A&M University.

2012 Calcitonin receptor 1 (*AaegGPRCAL1*) hindgut expression and functional analysis of myotropic action in females of the mosquito *Aedes aegypti* (L.). Vector Biology Group, the Department of Entomology in Texas A&M University.

GUEST LECTURES

2021 Malaria mosquitoes, an invited lecture for Medical Entomology, Department of Applied Biology, Kyungpook University, March, organized by Dr. Donhun Kim.

- 2017 Malaria mosquitoes, an invited lecture for Insects and Our Health, Department of Entomology, Iowa State University, February, organized by Dr. Ryan Smith.
- 2015 Utilization of software "POLO" program for monitoring insect resistance to insecticides in fields, in invited lecture for Insect Toxicology, Department of Entomology, Texas A&M University, January, organized by Dr. Patricia Pietrantonio.
- 2013 Bioinformatics tools for research of insect molecular physiology, invited lecture for Insect Physiology, Department of Entomology, Texas A&M University, October, organized by Dr. Patricia Pietrantonio.

TEACHING LECTURES

- 2007 Biotechnology and Society in Entomology (role: lecture grader) at Texas A&M University, Fall semester.
- 2006 Fundamentals of Organismal Biology Laboratory (role: lab instructor) at Northern Illinois University. Spring and Fall semester.
- 1999-2001 Clinical microbiology, hematology, chemistry and histology (role: lab instructor) at Korea University.

MENTORING ACTIVITIES

- 2024 Madison Stoltz (Ph.D student), Department of Microbiology at Iowa State University. *Project: Define the roles of extracellular vesicles in Plasmodium survival*
- 2024 Hia Kalita (Ph.D student), Department of Molecular, Cellular, and Developmental Biology at Iowa State University. *Project: Prostaglandin catalytic signal pathway*
- 2021-2022 Cheryl Blackmer (Undergraduate student), Department of Biology at Iowa State University. *Project: The effects of aspirin and ibuprofen on mosquito development and reproduction.*
- 2015-2020 Rebekah Reynolds (Ph.D. student), Department of Entomology at Iowa State University. *Project: The effect of 20-hydroxyecdysone (20E) on Plasmodium survival.*
- 2016-2019 Jyothsna Ramesh Kumar (Ph.D. student), interdepartmental Graduate Program in Immunobiology at Iowa State University. *Project: The roles of phagocytic immune cells in Plasmodium survival.*
- 2019 Beulah Esther Rani (Ph.D. student), interdepartmental Graduate Program in Immunobiology at Iowa State University. *Project: Characterization of mosquito hemocytes.*
- 2019 Catherine Fonder (Ph.D. student), Department of Molecular, Cellular, and Developmental Biology at Iowa State University. *Project: The effect of mosquito TNF alpha signaling on Plasmodium survival.*
- 2017-2018 Megan Rogers (Undergraduate student), Department of Microbiology at Iowa State University. *Project: The effect of mosquito TNF alpha signaling on Plasmodium survival.*

- 2014 Rachel Doran (Undergraduate student), Department of Biochemistry and Biophysics at Texas A&M University. *Project: Susceptibility status of Asian citrus psyllid (ACP) population to malathion in Weslaco, Texas.*
- 2013 Lewis Rogers (Research Experiences for Undergraduate student), Department of Entomology at Texas A&M University. *Project: Mosquito G protein-coupled receptors.*
- 2013 Salem Haminni (Undergraduate student), Department of Biochemistry and Biophysics at Texas A&M University. *Project: Mosquito G protein-coupled receptors.*
- 2013 Joshua Villazana (Post-undergraduate student), Department of Entomology at Texas A&M University. *Project: Monitoring Asian citrus psyllid (ACP).*
- 2010 Satnam Singh (Visiting scholar), Department of Entomology at Texas A&M University. *Project: Monitoring Helicoverpa amigera.*
- 2009 Sandra Truong (Undergraduate student), Department of Biochemistry and Biophysics at Texas A&M University. *Project: Mosquito G protein-coupled receptors.*
- 2008 Cymon Kersch (Research Experiences for Undergraduate student), Department of Entomology at Texas A&M University. *Project: Mosquito G protein-coupled receptors.*

AWARDS

- 2017 **First-tier Mention, Young Investigator Award**, American Society of Tropical Medicine & Hygiene, Baltimore, MD.
- 2017 **Honorary Alumni Award**, Department of Biological Science, Western Illinois University, Macomb, IL.
- 2009 **Runner-up**, 12th Annual Graduate Student Forum, Department of Entomology, Texas A&M University, College Station, TX.
- 2009 **Runner-up**, Agricultural/Agronomy/Botany/Plant Science, Student Research Week, Texas A&M University, College Station, TX

CERTIFICATION

Medical Technologist (28299, Korea)

PROFESSIONAL MEMBERSHIPS

American Society of Tropical Medicine & Hygiene
 Entomological Society of America
 American Society for Microbiology
 Korean Association of Medical Technologist

Editor

Associate editor: **Frontiers in Insect Science**

Guest editor (2022-2023): Special issue of Insect Immunity: Evolution, Genomics and Physiology in
Insects

INVITED PEER REVIEWER

Journal of Asia-Pacific Entomology
International Journal of Molecular Sciences
Frontiers in Microbiology
Achieves of Insect Biochemistry and Physiology
Insect Molecular Biology
Journal of Insect Physiology