

Karthikeyan Chandrasegaran

Post-Doctoral Research Associate

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EDUCATION

Ph.D. SASTRA University and National Centre for Biological Sciences, India *Jan 2013 – Sep 2018*
Subject: Evolutionary Ecology
Title: Non-lethal effects of predator-prey interactions: mechanisms and consequences
Advisors: Dr. Suhel Quader and Dr. Sanjay P. Sane

B.Tech. SASTRA University, India *Jul 2005 – May 2009*
Subject: Biotechnology

RESEARCH INTERESTS

Researcher with expertise in evolutionary ecology, behavior, sensory physiology, and field ecology of mosquitoes. Proficient in quantitative ecology, data analysis and visualization, and laboratory automation

RESEARCH EXPERIENCE

Postdoctoral Research Associate *Dec 2018 – Present*
Mentor: Dr. Clément Vinauger, Virginia Tech

- Develop an eco-epidemiological multiscale approach linking mosquito ecology, life-history traits, and mosquito-borne diseases
- Conduct high-throughput behavioral assays to study mosquito circadian rhythms, visual responses to threat, and thermopreference
- Foster collaborations with research groups working on chemical ecology, theoretical ecology, virology, and mathematical modeling
- Guest lecture and co-teach workshops on using R for study design and data analysis in life sciences research
- Mentor undergraduate students working on research projects in the laboratory
- Submission of independent research grants for federal and non-governmental agencies as an early career researcher
- Outreach initiatives for students from underrepresented, minority groups to promote diversity and inclusivity in STEM research in collaboration with the Biochemistry and Entomology Departments at Virginia Tech as well as the Science Museum of Western Virginia

Fulbright-Nehru Doctoral Research Fellow *Feb 2015 – Dec 2015*
Mentor: Prof. Steve Juliano, Illinois State University

- Study the population-level consequences of non-consumptive effects of larval predation in mosquitoes
- Exposure to mosquito field ecology: field sampling methods and monitoring of mosquito populations
- Contribution to grant proposals submitted to the collegiate sorority and federal agencies
- Present research findings in international entomological society meetings
- Outreach and cultural exchange initiatives involving school students at the *Illinois State* and *Northern Illinois Universities*

Graduate Student

Jan 2013 – Sep 2018

Mentor: Dr. Suhel Quader and Dr. Sanjay P. Sane, SASTRA University & NCBS

- Perform experiments investigating threat-sensitive behaviors and ontogeny of larval and adult mosquitoes
- Standardize methods for quantification of energy reserves in individual mosquitoes
- Co-supervise and mentor undergraduate and postgraduate students
- Conduct hands-on R training sessions for graduate students as part of graduate student committee initiatives
- Present research findings at national seminars and conferences
- Preparation and publication of research manuscripts in peer-reviewed journals

Junior Research Fellow

Jul 2009 – Dec 2012

Mentor: Dr. Suhel Quader, NCBS and Dr. Kavita Isvaran, IISc

- Training on mosquito rearing methods, establishment, and maintenance of *Aedes*, *Anopheles*, *Culex*, and *Toxorhynchites* mosquito colonies
- Completion of courses on basic and advanced statistics, quantitative ecology, and science communication
- Volunteer in organizing committee of the Student Conference on Conservation Science, Bengaluru Chapter
- Volunteer in organizing committee of the Young Ecologist Talk and Interact conference, Bengaluru

JNCASR Summer Research Fellow

Jul 2008 – Aug 2008

Mentor: Dr. Suhel Quader, NCBS

- Investigate the influence of larval predators on larval development of *Aedes aegypti*
- Submit research findings as a report which laid the foundation for my subsequent research

TEACHING EXPERIENCE

- **Statistics for Biologists** (40 hours; remote instruction; instructor-on-record) Fall 2022
- **Data wrangling and visualization** using R, BCHM 4354 Biochemical communication (guest lectures) Spring 2021, 2022
- **Network-based approaches** to analyze transcriptomic data (guest lecture) Spring 2022
- **Insecticides, deterrents, and repellents** in the context of vector-borne diseases, BCHM 4354 Biochemical Communication (guest lectures) Spring 2020, 2021
- **Data management** and revisiting statistical thought (guest lecture) Fall 2020
- **Data wrangling** in R (workshop) Fall 2017
- **Data visualization** using ggplot2 in R (workshop) Spring 2016
- A brief introduction to **linear models in R** (workshop) Fall 2013
- Quantitative methods in the study of **plant-animal interactions** (guest workshop) Spring 2013
- **Ecology Skills Session** for graduate students (bi-monthly workshop) 2010 – 2014
- Co-mentored sixteen short-term undergraduate/postgraduate students 2011 – 2017

FELLOWSHIPS, AWARDS, AND HONORS

- Research publication (Chandrasegaran, K., *et al.*, 2020) was highlighted in **Trends in Parasitology's special issue** on Multidisciplinary Perspectives on Mosquito Ecology and Vector-Borne Disease Transmission 2020
- Research publication (Chandrasegaran, K., *et al.*, 2019) was chosen to feature in the **Frontiers in Ecology and Evolution 2019 Highlights** 2019
- **Fulbright-Nehru Doctoral Research Fellow** at that Illinois State University, USA 2015
- The Technology Transfer Award awarded by the Centre for Cellular and Molecular Platforms, India for implementing cost-effective automation in ecological research 2012
- Nomination as a **finalist for the Commonwealth Scholarships UK 2009** by the Ministry of Human Resources and Development, Government of India 2009

- **Bachelor's degree obtained with Distinction**, SASTRA University, India 2009
- Best paper presentation award, Anna University, India 2009
- **Rajiv Gandhi Sciences Talent Research Scholar Award** from the Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), for outstanding performance as a Summer Research Fellow 2008
- Best paper and poster presentation award, Indian Institute of Technology, Roorkee, India 2007

PUBLICATIONS

* indicates undergraduate researcher

1. Reinhold, J. M., **Chandrasegaran, K.**, Oker, H*, Crespo, J. E., Vinauger, C., & Lahondère, C. (2022). Species-specificity in thermopreference and CO₂-gated heat-seeking in *Culex* mosquitoes. *Insects*, 13(1), 92.
2. Wynne, N. E., **Chandrasegaran, K.**, Fryzlewicz, L*, & Vinauger, C. (2022). Visual threats reduce blood-feeding and trigger escape responses in *Aedes aegypti* mosquitoes. *bioRxiv*.
3. Walker, M., **Chandrasegaran, K.**, Vinauger, C., Robert, M. A., & Childs, L. M. (2021). Modeling the effects of *Aedes aegypti*'s larval environment on adult body mass at emergence. *PLoS computational biology*, 17(11), e1009102.
4. **Chandrasegaran, K.**, Lahondère, C., Escobar, L. E., & Vinauger, C. (2020). Linking Mosquito Ecology, Traits, Behavior, and Disease Transmission. *Trends in Parasitology*, 36(4), 393-403.
5. **Chandrasegaran, K.**, Sriramamurthy, R*, Singh, A*, Ravichandran, P*, & Quader, S. (2020). How do prey responses to non-lethal predation threat vary across life-history stages? – A cost-benefit analysis. *Environmental Entomology*, 49(5), 1032-1040.
6. **Chandrasegaran, K.**, & Juliano, SA. (2019). How do trait-mediated non-lethal effects of predation affect population-level performance of mosquitoes? *Frontiers in Ecology and Evolution*, 7, 25.
7. **Chandrasegaran, K.**, Kandregula, SR*, Quader, S., & Juliano, SA. (2018). Context-dependent interactive effects of non-lethal predation on larvae impact adult longevity and body composition. *PLoS ONE*, 13(2), e0192104.
8. **Chandrasegaran, K.**, Singh, A*, Laha, M*, & Quader, S. (2017). Playing it safe? Behavioural responses of mosquito larvae encountering a fish predator. *Ethology Ecology & Evolution*, 30, 70-87.
9. **Karthikeyan, C.**, Ramanathan, N*, & Princy, SA. (2011). Cystic Fibrosis: A joujou for pathogens. *Asian Journal of Chemistry*, 23(1), 15-18.
10. **Karthikeyan, C.**, Krishnan, R., & Princy, SA. (2008). Bionics and Structural Biology: A novel approach for bio-energy production. *Journal of Bionic Engineering*, 5(1), 25-32.

OTHER PUBLICATIONS

1. **Chandrasegaran, K.** (2020). Not a Mosquito, after all! *Center for studies in Ethnobiology, Biodiversity, and sustainability* (CEIBA Trust) Newsletter, 2(4), 2-6
2. **Chandrasegaran, K.** (2022). Impostorism and the Travails of Immigrant Postdocs in the United States. *The POSTDOCKET*, 20(1).

GRANTS

- **NIH Pathway to Independence Award (K99/R00)**; rated 'outstanding' with a 25-impact score.
payline announcement pending 2021 – 22
- **Patel Grant** in recognition of my doctoral research proposal as a **Fulbright grantee** 2015
- **R.D.Weigel Research Grant** awarded by the Beta Lambda Chapter of the Phi Sigma Biological Honor Society at the Illinois State University 2015
- **SASTRA University's Innovation Fund** – A research grant awarded for my proposal on bacterial quorum sensing 2009

PROFESSIONAL AFFILIATIONS

Entomological Society of America (ESA)	2015 – Present
Animal Behavior Society	2019 – Present
Society for Integrated and Comparative Biology (SICB)	2020 – Present

PROFESSIONAL SERVICE

- Diversity, Equity, and Inclusion Chair at **Virginia Tech Postdoctoral Association** 2021 – Present
- **Mentor graduate students** on research proposals for the NSF's Graduate Research Fellowship Program Fall 2021
- Active contributor to the Ecology Skills Session, an initiative to provide hands-on training to graduate students in data analysis using R 2010 – 2014
- Member of the organizing committee for the second and third editions of the Young Ecologists Talk and Interact (YETI) meeting, Bengaluru, India 2010 – 2011
- Member of the organizing committee for the first meeting of the Student Conference on Conservation Science (SCCS), Bengaluru, India 2010
- Member of the EclipseWatch team, a **citizen science initiative** by the National Centre for Biological Sciences, Bengaluru, India 2010
- Active member of the Student Association at the School of Chemical and Biotechnology at SASTRA University 2008 – 2009

Manuscript Reviewer

2017 – Present

eLife	Journal of Asia Pacific Entomology
Proceedings of the Royal Society B	Current Science
Scientific Reports	Malaysian Journal of Medicine & Health Sciences
PLOS Neglected Tropical Diseases	Malaria Journal
PLOS One	Molecular Neurobiology
Ecological Entomology	Entomological Science
Biological Control	Journal of Insect Physiology

Outreach

- The Science of Flight, Virginia Museum of Natural History Spring 2022
- Healthy Kids Day Spring 2022
- COMPASS Outreach Grant Program, American Society for Cell Biology Fall 2021
- Virginia Tech Science Festival, an outreach event for school children 2020 – Present
- **Hokie BugFest**, an initiative to promote entomology among local communities 2019 – Present
- Lab Chats, Science Museum of Western Virginia (virtual event) Fall 2020
- *Kids' Tech University*, an outreach event for kids that showcases science experiments 2020 – Present
- Member of the program involving minority undergraduates from **Historically Black Colleges and Universities (HBCU) and Minority Serving Institutions (MSI), USA** Fall 2019
- Member of the program involving students from the *Black College Institute*, an academic summer enrichment program in Virginia Tech Fall 2019

SELECT PRESENTATIONS

- Larval ecology modulates host-seeking preferences in mosquitoes (2022), *Society for Integrative and Comparative Biology (SICB) meeting*, Phoenix, Arizona, USA
- Deciphering the mechanistic links between larval ecology and host-seeking behavior in mosquitoes (2021). *Society for Integrative and Comparative Biology* (Virtual meeting)

- A transcriptomic approach to explore the mechanistic links between larval growing conditions and adult host-seeking behavior in female mosquitoes (2020). *Annual Meeting of the Entomological Society of America* (Virtual meeting)
- Adult body size affects host-seeking behavior of female mosquitoes (2020), *Animal Behavior Society meeting* (Virtual meeting)
- Larval ecology and host-seeking behavior of female mosquitoes (2019). *Annual Meeting of the Entomological Society of America*, St. Louis, Missouri, USA
- Playing it safe? Behavioural responses of mosquito larvae encountering a fish predator (2018). *Society for Integrative and Comparative Biology (SICB) meeting*, San Francisco, California, USA
- Refuge use or predator avoidance? Microhabitat preferences of mosquito larvae exposed to predation risk (2017). *Annual Symposium of the Centre for Ecological Sciences*, Indian Institute of Science, Bengaluru, India
- Assessing the impact of nutrition availability, competition, and predation threat on survival and fitness of *Aedes aegypti* (2015). *Annual Meeting of the Entomological Society of America*, Minneapolis, Minnesota, USA

REFERENCES

1. **Clément Vinauger Ph.D.**, Assistant Professor,
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