

Dinesh Natesan, Ph.D.

SCIENTIST · ENGINEER

University of California, Santa Barbara



Education

National Centre for Biological Sciences, Bangalore

KTH Royal Institute of Technology, Stockholm

Sep. 2012 - Dec. 2020

Joint Doctorate in Life Sciences and Computer Science

Bangalore | Stockholm

Co-Advisor: Sanjay P. Sane (NCBS) | Co-Advisor: Örjan Ekeberg (KTH)

Thesis: Neuromechanical basis of airflow-dependent antennal positioning in hawkmoths

Birla Institute of Technology and Science (BITS), Pilani

Sep. 2006 - Aug. 2011

Bachelor of Engineering (honors) in Electrical and Electronics Engineering

Master of Science (honors) in Biological Sciences

Goa, India

A dual degree in electronics and biology

Employment

Nov. 2021 - present

Postdoctoral Researcher

Santa Barbara

University of California, Santa Barbara

Advisor: Sung Soo Kim

Jan. 2019 - Apr. 2020

Chief Executive Officer & Co-Founder

Bangalore

LightSpeedAI Labs Pvt. Ltd.

Sep. 2011 - Aug. 2012

Junior Research Fellow

Bangalore

National Centre for Biological Sciences

Advisor: Sanjay P. Sane

Research Experience

Nov. 2021 - present

Novel two-photon microscope to probe heading representation in flying flies

Santa Barbara

University of California, Santa Barbara

Building a fast two-photon microscope with optical neuron tracking and motion correction to record from neural circuits that help maintain heading representation in flying fruit flies.

Investigating scene-based navigation in fruit flies using a naturalistic VR arena

Santa Barbara

University of California, Santa Barbara

Building naturalistic virtual reality (VR) arena that faithfully activates fly photoreceptors, generating realistic scenes using GANs, 2p imaging to record neural activity in tethered flies.

Jan. 2013 - Dec. 2020

Control architecture underlying antennal positioning in hawkmoths

Bangalore | Stockholm

National Centre for Biological Sciences | KTH Royal Institute of Technology

Wind-tunnel behavioral experiments, bilateral electromyography of antennal muscles, control theoretic and neural circuit computational models that produce tuneable antennal control.

Fast mandible strikes in termites

Bangalore

National Centre for Biological Sciences

Biomechanical energy storage in termite mandibles and rapid strike on predator attack, high-speed filming of mandible strikes using high-intensity, custom-cooled experimental setup.

Free-flight pitch-up maneuvers in houseflies

Bangalore

National Centre for Biological Sciences

Cross-correlational and statistical analysis of wing kinematics and body rotations, use of multiple high-speed cameras to capture 3D wing movements using direct linear transformation.

Jan. 2011 - Dec. 2017

Odor source localization in freely flying fruit flies

Bangalore

National Centre for Biological Sciences

Multisensory integration in foraging fruit flies in airflow and still air, multi-camera fly tracking across wind tunnel, statistical analysis to infer algorithmic basis of olfactory navigation behavior.

Industry Experience

- Jan. 2019 - Apr. 2020 **Analog matrix multiplications using optoelectronic processors** Bangalore
[LightSpeedAI Labs](#)
Vector-matrix multiplications to accelerate deep neural networks, analog computation using properties of light, fundraising through pre-seed and seed investment rounds.
- Jul. 2010 - Dec. 2010 **Firmware development for specialized hardware** Bangalore
[Texas Instruments](#)
Wrote custom firmware for 1) soundbars to reduce noise, add surround-sound effects and for 2) industry grade tri-vector meters that uses 24-bit ADCs to sample V/I and compute power.

Skills

- Disciplines** Electronics, Biology, Optics, CAD, Computer Science, Data Science
- Specialization** Experimental Neuroscience, Computational Neuroscience, Signal Processing, Control Theory
- Programming** MATLAB, Python, R, C/C++/Embedded C, LaTeX
- Software** Autodesk Inventor, OpenSCAD, Simulink, Labview
- Soft skills** Critical Thinking, Rapid Evaluation and Prototyping, Scientific Communication, Collaboration, Entrepreneurship, Mentorship
- Languages** English, Tamil, Telugu, Hindi

Publications

- 2020 **Neuromechanical basis of airflow-dependent antennal positioning in hawkmoths** PHD THESIS
[Dinesh Natesan](#)
ISBN: 978-91-7873-697-3 ■■
- 2019 **Tuneable reflexes control antennal positioning in flying hawkmoths** NAT. COMMUN.
[Dinesh Natesan](#), [Nitesh Saxena](#), [Örjan Ekeberg](#), and [Sanjay P. Sane](#)
DOI:10.1038/S41467-019-13595-3 ■■
- 2018 **Odor source localization in complex visual environments by fruit flies** J. EXP. BIOL.
[Nitesh Saxena*](#), [Dinesh Natesan*](#), and [Sanjay P. Sane](#)
DOI:10.1242/JEB.172023 ■■ *EQUAL CONTRIBUTION
- **Kinematics of free-flight pitch-up maneuvers in the housefly, *Musca domestica*** IN PREP.
[Dinesh Natesan](#), [Navish Wadhwa](#), and [Sanjay P. Sane](#)

Presentations

- 2023 **Navigating in visual environments: Neural mechanisms of visual feature extraction in flies** INVITED TALK
[California NanoSystems Institute \(CNSI\)](#) Santa Barbara, USA
- 2021 **Flexibility of reflexes: How Johnston's organs modulate the antennal set-point in flying hawkmoths** CONFERENCE TALK
[Society for Integrative and Comparative Biology](#) Virtual
- 2020 **Foraging for food: How fruit flies locate an odor source in complex visual and airflow environments** CONFERENCE TALK
[Animal Behavior Live](#) Virtual
- 2020 **Tuneable reflexes control airflow-dependent antennal positioning in flying hawkmoths** CONFERENCE TALK
[Monsoon Brain Meeting](#) Virtual
- 2016 **Airflow-mediated antennal positioning in flying hawkmoths** CONFERENCE TALK
[Society for Integrative and Comparative Biology](#) Portland, Oregon
- 2015 **Airflow-mediated antennal positioning in flying hawkmoths** SYMPOSIUM TALK
[EuroSPIN Annual Meeting](#) Stockholm, Sweden
- 2014 **Multisensory integration in the antennal motor system of hawkmoths** SYMPOSIUM TALK
[EuroSPIN Annual Meeting](#) Edinburgh, Scotland
- 2013 **Multisensory integration in the antennal muscles of hawkmoths** SYMPOSIUM TALK
[EuroSPIN Annual Meeting](#) Friburg, Germany

Honors & Awards

2022-23	Ambassador , eLife	Remote
2019	Seed Investment for Startup , Entrepreneur First (EF)	Bangalore
2018	Founder Cohort , Entrepreneur First (EF)	Bangalore
2017	Best Poster Award , Annual Talks , National Centre for Biological Sciences (NCBS)	Bangalore
2016	SICB Student Journalism Program , Society for Integrative and Comparative Biology	Portland, OR
2012	Erasmus Mundus Doctoral Scholarship , EuroSPIN Joint Doctoral Program	Bangalore, Stockholm

Professional Development

2023	Neural Data Science , Cold Spring Harbor Laboratory	New York
2023	Promoting Postdoc Progress , University of California, Santa Barbara	Santa Barbara
2021	Methods in <i>Drosophila</i> Biology , National Centre for Biological Sciences	Virtual
2020	Junior Scientist Workshop on Mechanistic Cognitive Neuroscience , HHMI Janelia Research Campus	Remote
2016	Okinawa Computational Neuroscience Course (OCNC) 🌐 , Okinawa Institute of Science and Technology	Okinawa

Professional Activities

2024	This Postdoc Life (postdoc talk series + community-building) , Co-organizer	UCSB
2024	Reviewer , J. Exp. Biol.	n=2
2023	Cultivating a Healthy and Productive Lab , Co-organizer	eLife, remote
2023	Reviewer , J. Exp. Biol.	n=4
2023	Co-reviewer , Nature , Nat. Comm.	n=2
2022	Reviewer , J. Exp. Biol. , Curr. Biol.	n=5
2022	Co-reviewer , Neuron , Nature	n=2
2021	Reviewer , J. Exp. Biol. ; PLoS Comput. Biol.	n=7
2020	Session Chair , Monsoon Brain Meeting	Virtual
2018	Probability, Statistics and Linear Algebra Workshop 🌐 , Co-organizer	NCBS
2017	Programming Workshop 🌐 , Co-organizer	NCBS
2016-19	Machine Learning Journal Club 🌐 , Co-organizer	NCBS

Science Outreach

2024-	Digital Garden , Umwelt ■	Self-hosted
2022	Research Highlight , A persistent behavioral state enables sustained predation of humans by mosquitoes ■	preLights
2021	Research Highlight , NeuroMechFly, a neuromechanical model of adult <i>Drosophila melanogaster</i> ■	preLights
2021	Opinion , Science and the art of relentless questioning ■	ScienceOut