**OJAS NATARAJAN Ph.D.**

**Curriculum Vitae**

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# Education

**Ph.D. Biological Sciences 2012-2018**

College of Science

Clemson University SC

**M.Sc. Microbiology 2008-2010**

G.N. Khalsa College

University of Mumbai IN

**B.Sc. Microbiology 2005-2008**

K.C. College

University of Mumbai IN

# Work Experience

**Research Associate 2021- Current**

Department of Pediatrics

University of South Florida Fl

**Postdoctoral Fellow 2019-2021**

Department of Pediatrics

University of South Florida Fl

**Graduate Teaching Assistant 2019-2021**

Department of Biology

Clemson University SC

**Lecturer 2011-2012**

Department of Microbiology and Biotechnology

S.S.&L.S. Patkar College Mumbai IN

# Publications

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| **Natarajan, O**.; Gibboney, L.S.; Young, M.N.; Lim, S.J.; Pluta, N.; Atkinson, C.G.F. Leigh, B; Liberti, A.; Kees, E.K.; Breitbart, M.; Gralnick, J.A; Dishaw, L.J (2024) Prophages regulate *Shewanella fidelis* 3313 motility and biofilm formation: implications for gut colonization dynamics in Ciona robusta, Biorxiv, <https://doi.org/10.1101/2022.11.23.517592> |
| Liberti, A.; **Natarajan, O.;** Atkinson, C.G. F; Dishaw, L.J (2022).Secreted immunoglobulin domain effector molecules of invertebrates and management of gut microbial ecology. Immunogenetics 74, 99–109 <https://doi.org/10.1007/s00251-021-01237-2> |
| Liberti, A., Leigh, B.A.; Graham, Z.; **Natarajan**, **O**.; and Dishaw, L.J (2022). A Role for Secreted Immune Effectors in Microbial Biofilm Formation Revealed by Simple In Vitro Assays. In: Rast, J., Buckley, K. (eds) Immune Receptors. Methods in Molecular Biology, vol 2421. Humana, New York, NY. <https://doi.org/10.1007/978-1-0716-1944-5_9> |
| Liberti, A., **Natarajan, O.**; Atkinson. C.G.; Sordino, P.; and Dishaw, L.J. (2021) Reflections on the use of an invertebrate chordate model system for studies of gut microbial immune interactions, Frontiers in immunology doi 10.3389/fimmu.2021.642687 |
| **Natarajan, O**.; Angeloni, J.; Bilodeau M.;Russo K.; Dong, Y.; Cao, M. (2021) The Immunomodulatory Effects of Royal Jelly on Defending Against Bacterial Infections in the *Caenorhabditis elegans* Model., Journal of Medicinal Food, <https://doi.org/10.1089/jmf.2020.0050> |
| Oberstaller, J. etal (2020) Uncovering host-microbiome interactions in global systems with collaborative programming: a novel approach integrating social and data sciences., F1000 Research Limited, [doi.10.12688/f1000research.26459.1](https://f1000research.com/articles/9-1478) |
| **Natarajan, O**.; Cao, M.; Dong. Y (2018) Investigation of Molecular Mechanisms Involved in Retardation of Immunosenescence in *Caenorhabditis elegans* by Royal Jelly. [Clemson University](https://tigerprints.clemson.edu/all_dissertations/2555/) |
| Guha,S.\*; **Natarajan, O.\*;** Murbach, C.G.; Dinh, J.; Wilson, E.C.; Cao, M.; Zou, S.; Dong, Y. (2014)Supplement Timing of Cranberry Extract Plays a Key Role in Promoting *Caenorhabditis elegans* Healthspan. Nutrients, 6, 911-921. [doi:10.3390/nu6020911](https://www.mdpi.com/2072-6643/6/2/911) (\*Co-first authorship) |
| **Natarajan, O**.; Ranade, V.V. (2010) Effect of ferric chloride on biofilms of Pseudomonads and transformation of *Chlamydomonas reinhardtii bolA* in *Pseudomonas aeruginosa*. Mumbai University |
| **Natarajan, O.;** Bagla H.; Padmanabha P. (2007) Biosorption of Heavy metals *by Saccharomyces cerevisiae* and *Spirulina patens*. Jigyasa, K.C. College |

# Awards and Honors

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| --- | --- |
| Best poster – immunology and Microbiology – USF Research Day | March 2023 |
| New Investigator Award – USF Health | April 2022 |
| Runner up USF Hackathon | February 2020 |
| Best poster immunology - Research Day USF | February 2020 |
| Runner up poster award – FASEB | July 2019 |
| **College of Sciences Outstanding Graduate in Learning Award** | **April 2018**   |
| It is an award that recognizes a graduate student across the entire College of Science for their contribution towards mentoring and teaching |  |
| **Second runner up prize for poster presentation at the SC aging conference**  | **April 2017** |
| **Runner up at the university level, 3 MT thesis**  | **October 2017** |

# Grants

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| --- | --- | --- | --- |
| Valente Scholarship Award | Awarded | $10000 | 2024 |
| USF New Researcher Grant | Awarded | $10000 | 2022 |
| Simmons Ecology Grant for postdocs |  |  | 2020 |
| SPAMS Travel Award | Awarded | $1000 | 2018 |
| Biological Sciences Graduate Student Travel Award | Awarded | $350 | 2018 |

# Invited Talks

**Natarajan, O** **(2023)** Filter feeding marine invertebrates reveal complex interactions between microbes and host USF College of Marine Science October 2023

**Natarajan, O** **(2023)** What a marine invertebrate can tell us about the gut, environment, and you? Pine View Science National Honor Society, May 2023

# conference participation

**Natarajan, O** (2023) Innate immune discrimination of bacterial strain variants in the gut of animals, Florida ASM

**Natarajan, O.; *et al*** (2022)Prophages regulate *Shewanella fidelis* behaviors in ways that influence gut colonization of *Ciona robusta*, Beneficial Microbes Maddison WI

**Natarajan, O**.; Atkinson, C.G.F; Dishaw, L.J; (2019) Lysogeny plays a role in shaping gut microbiota. FASEB, Steamboat springs CO.

**Natarajan, O**.; Cao, M.; Dong, Y.; (2018) p38 MAPK, insulin signaling and Wnt signaling pathway are required for royal jelly mediated response to immunosenescence in *C. elegans* against *S. aureus*. ***C. elegans* topics meeting: Stress Pathogenesis Ageing Metabolism Small RNA (SPAMS), Madison WI.**

**Natarajan, O**.; Cao, M.; Dong, Y.; (2018) Royal Jelly Promotes Survival of *Caenorhabditis elegans* Through Known Immune and Stress Response Pathways Against Gram Positive and Gram Negative Pathogens. **American Society of Microbiologists (ASM) Microbes, Atlanta GA.**

**Natarajan, O.;** Cao, M.; Dong, Y.;(2018) Royal jelly retards immunosenescence in *C. elegans* against *S. aureus* infection through p38 MAPK, insulin signaling and Wnt signaling pathway. **Nathan Shock Symposium on basic biology of aging, UAB, Birmingham AL.**

**Natarajan, O.;** Cao, M**.;** Dong, Y. (2017) Royal jelly supplementation protects aged population of *Caenorhabditis elegans* from pathogen infection. **South Carolina aging conference, Columbia SC.**

# Campus talks

**Natarajan, O** **(2023)** A simple chordate offers insight into regulators of microbiome ecology and influences on gut development and immune maturation. Microbiome Town Hall April 2023

**Natarajan, O (2021)** Trans kingdom influences of prophages: evidence from a simple chordate, WIP, USF

**Natarajan, O (2019)** Role of lysogens in shaping gut microbiota, USF Genomics symposium, USF

**Natarajan, O** **(2018)** Royal jelly promotes immunity in *Caenorhabditis elegans* through known signaling pathways. **Brown bag seminar, Clemson University**

**Natarajan, O** **(2017)** Using Royal jelly as a nutraceutical to identify key molecular pathways that play a role in improving immunity in *Caenorhabditis elegans*. **3MT Thesis, Clemson University**

**Natarajan, O** **(2016)** The immunomodulatory effect of Royal jelly on immunity in *C. elegans* against *S. aureus.* **Clemson Biological Sciences Annual Student Symposium**

# campus posters presented

**Natarajan, O.; *et al*** (2023)Prophages may regulate host immune responses by manipulating bacterial secondary signaling pathways, USF Research Day 2023

**Natarajan, O**; Dong, Y. (2017) Insulin signaling and p38 MAPK pathways interact to mediate Immunity in *Caenorhabditis elegans* on royal jelly supplementation to protect from *Staphylococcus aureus* infection. **Biological Sciences Departmental Retreat, Asheville NC**

# Mentored Projects (by Mentees\*)

## University of South Florida

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| Thomas, L\*; Gibboney, S.L.; **Natarajan, O**; Dishaw, L.J (2023) Role of Stran variants of Shewanella fidelis 3313 on host immune response | Summer undergraduate intern |
| Bhatnagar, S\*; **Natarajan, O**; McMinds, R; Dishaw LJ (2023) Characterization of marine symbiont Endozoichomonas in *Ciona robusta*  | Masters project |
| Kingsford, S\*; Gibboney, S.L.; **Natarajan, O**; Dishaw, L.J (2022) Effect of Loperamide on the behavior and physiology of juvenile *Ciona robusta*  | High school intern |
| Wertz, K\*; **Natarajan, O**; Dishaw, L.J (2022) Effect of prophages on growth rates of *Shewanella fidelis* 3313 | Summer undergraduate intern |
| Francis, L\*; **Natarajan, O**; Dishaw, L.J (2022) Designing E2 Crimson fluorescent plasmids in pBBR-MCS vector | Summer undergraduate intern |
| Pluta, N\*; **Natarajan, O**; Dishaw L.J (2021) Role of phosphodiesterase B (*pdeB*) on prophage mediated cyclic di GMP regulation in *Shewanella fidelis* 3313 | Post graduate intern |
| Cruz, A\*, **Natarajan, O**; Dishaw LJ (2021) Exploring the effects of prophages on the behavior of marine bacteria isolated from the gut of a protochordate model  | Master’s Thesis |
| Peterson A\*, Atkinson, C.G.F; **Natarajan, O**; Dishaw L.J(2019) Screening for lytic phages against Shewanella gut bacteria from sea water from Gulf of Mexico  | NSF REU intern |
| Poock C\*; Atkinson, C.G.F; **Natarajan, O**; Dishaw L.J(2019) Effects of prophages on spatial colonization of *Shewanella fidelis* 3313 in the gut of *Ciona robusta* | Capstone project |
| Walster, E\*; Nirmalan, S\*; **Natarajan, O**; Dishaw LJ (2019) DNA fingerprinting and sample preparation for Pacbio sequencing of gut bacteria of *Ciona robusta* | Under graduate interns |
| Daro G\*; **Natarajan, O**; Dishaw LJ (2019) Cross infectivity of prophages found in the *Ciona* gut and effect of change in pH on prophage induction and infectivity | Undergraduate intern |

## Clemson University

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| Sutton, P\*; McKamy, A\*; Maich, S\*; **Natarajan, O**; Cao, M; Dong Y (2018) Low concentrations of ethanol improves the healthspan of *C. elegans* through heat shock factor -1 and boosts the gut integrity of worms |
| Staley, T\*; Richardson, L\*; Burgin, C\*; **Natarajan, O**; Cao, M; Dong Y (2017) Effects of alcohol on regulation of proteostasis in *C. elegans* |
| Rypkema, E\*; Duvall, A\*; Phillips, A\*; Shah, M\*, **Natarajan, O**; Cao, M; Dong Y (2016) Role of ethanol on healthspan of *C. elegans* |
| Edmunds, J\*; Klauber, M\* Dubnicka, I\*; Wani, I\*; Gedney, L\*; Hsu, L; **Natarajan, O**; Cao, M; Dong Y (2015) Effect of royal jelly on healthspan and chemotaxis of *C. elegans* towards different pathogens |

## Mumbai University

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| Malashe, V\*.; **Natarajan, O**. (2011) Isolation of xylanase producing organisms from soil and its use in clarification of juices. (Mentored Master’s Thesis) |
| Shah, N\*.; **Natarajan, O**. (2011) Development of Idli Batter Starter Cultures and evaluation of Idlis for Nutritional, Textural and Sensory Quality. (Mentored Master’s Thesis) |
| Junnarkar, S.; **Natarajan, O**. (2011) Potential role of mobile phones in spreading bacterial infection (Mentored Master’s Thesis) |

# teaching experience

## Clemson University, Clemson SC

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| --- | --- |
| Creative Inquiry (CI) | Fall 2012 – Spring 2018 |
| General Microbiology MICRO 3051 | Spring 2014 - Spring 2018 |
| General Biology 1050 | Spring 2013 - Fall 2013 |
| Introduction to Biology BIOL 120 | Fall 2012 |

### Teaching Assistant

Department of Biological Sciences

## University of Mumbai, Mumbai, IN

Lecturer

Dept. of Microbiology & Biotechnology, S.S& LS Patkar College, Mumbai

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#### Courses taught Fall 2011 - Spring 2012

* General Microbiology and Genetics to freshman undergraduates
* Biochemistry to sophomores
* Industrial Microbiology to seniors.

### Adjunct Faculty

 Dept. of Microbiology, Bhavans College, Mumbai

Duties performed Fall 2010

* Conducted lectures in immunology and biochemistry to Sophomores
* Topics covered include overview of antigens, antibody and their interactions, basics of carbohydrates, proteins, and post translational modifications in proteins.
* Conducted courses on genetic code and plasmids and conjugation to Seniors

# Field experience

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| Location | Purpose | Date |
| Gulf of Mexico, Fl | NSF REU program, USF | June 2019 |
| Bokeelia Pier, Fl | Clam collection, Sanger Moore initiative | June 2021 |
| Gulf of Mexico, Fl | Oceanography Camp for Girls, USF | July 2021 |
| Tampa Bay, Fl | Collaboration with Dr. Linda Holland and Dr. Zybnek Kozmik for Amphioxus collection | September 2023 |
| Tampa Bay, Fl | Collaboration with Dr. Shen Jean Lim to characterize symbionts of Lucinid clams from Tampa Bay | September 2023 |

# review duties

* Nature Reviews Immunology
* PLOS Pathogens
* Microbiology Society
* Archives of Microbiology
* STAR Protocols Cell
* Environmental international
* Frontiers in Microbiology
* Frontiers in Soil Sciences
* PloS one

# wORKSHOP AND SEMINARS

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| Workshop for Agilent Flow cytometryEckard College| St. Petersburg FL | August 2023 |
| Intro to Flow cytometry and operation of CYTEK Northern LightsUniversity of South Florida| St. Petersburg FL | February 2023 |
| NIH Grant writing workshopUniversity of South Florida |Tampa FL | October 2022 |
| USF Summer Grant writing workshopUniversity of South Florida| Tampa FL | June 2022 |
| RNA Seq WorkshopGenomics Core| University of South Florida| Tampa FL | June 2022 |
| GME writing workshopUniversity of South Florida| Tampa FL | March 2022 |
| LC-MSQqQ TrainingProteomics Core| University of South Florida| Tampa FL | January 2022 |
| Introduction to R WorkshopDr. Pat Schloss| Riffomonas workshop| MI | January 2022 |
| RNASeq Genomics Analysis workshopGenomics Core| University of South Florida| Tampa FL | September 2020 |
| Introduction to Python and Machine LearningClemson University | August 2020 |

# Affiliations

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| --- | --- |
| Member, Florida American Society of Microbiologists | 2023- Current |
| Member, American Society of Microbiologists | 2018 - Current |
| **Officer, Biological Sciences Graduate Student Association (BSGSA)** | **2017- 2018** |
| **Member, Clemson SCUBA** | **2017 - 2018** |
| **Treasurer for Biological Sciences Graduate Student Association (BSGSA)**  | **2016 - 2017** |

# university outreach service

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| Skype-A-Scientist | 2019- Current |
| Career guidance and mentorship seminar KC College, Mumbai India | **2020** |
| Mentor, NSF REU program fir Dishaw Lab at USF | **2019** |
| **Poster judging at the undergraduate and Masters level at KC College, Mumbai India** | 2020 |
| **Judging -** 2021 LSSF STEM Undergraduate Research Symposium | **2021** |
| Hillsborough Regional STEM Fair Judge | **2021** |
| Mentor- Oceanography camp for girls, College of Marine Sciences, USF | **2021 - 2023** |
| Blogging – Oceanography Camp for girls, College of Marine Sciences, USF | **2021** |
| Judging Junior and Secondary School students at STEM Fair – District level | **2023** |
| Judging SE Zone 3 MT Thesis | **2023** |
| Set up a booth at Pinellas Science Day for USF College of Marine Science | **2023** |

# Languages

English – proficient in written and oral communication

Hindi - proficient in written and oral communication

Marathi - proficient in written and oral communication

Tamil - proficient in oral communication

French – Middle school level proficiency in written communication