

Abhilesh Dhawanjewar, Ph.D.

EVOLUTIONARY BIOLOGIST · UNIVERSITY COLLEGE LONDON, UK

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Education

Ph.D. in Evolutionary Biology

UNIVERSITY OF NEBRASKA-LINCOLN, USA

Advisors: Dr. Kristi Montooth & Dr. Colin Meiklejohn

Aug 2015 - Jul 2022

Integrated B.S.-M.S. Dual Degree

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH, PUNE, INDIA

Advisor: Dr. M.S. Madhusudhan

Aug 2010 - May 2015

Skills

Programming

Python, R, Bash, slurm, LaTeX

DevOps

Docker, Kubernetes, NGINX

Analysis

Mixed-model regressions, Sequence Analysis, Protein Structure, Phylogenetics, Pipeline Development

Publications

JOURNAL ARTICLES

Dhawanjewar A.S.*, Roy A.A.*, & Madhusudhan M.S. (2020). A knowledge-based scoring function to assess the stability of quaternary protein assemblies. *Oxford Bioinformatics*, 36(12), 3739-3748.

Roy, A.A.*, **Dhawanjewar, A.S.***, Sharma, P., Singh, G., & Madhusudhan, M.S. (2019). Protein Interaction Z Score Assessment (PIZSA): an empirical scoring scheme for evaluation of protein-protein interactions. *Nucleic acids research*, 47(W1), W331-W337.

Montooth, K.L., **Dhawanjewar, A.S.**, & Meiklejohn, C.D. (2019). Temperature-sensitive reproduction and the physiological and evolutionary potential for Mother's Curse. *Integrative and comparative biology*, 59(4), 890-899.

Nelson, T.C., Jones, M.R., Velotta, J.P., **Dhawanjewar, A.S.**, & Schweitzer, R.M. (2019). UNVEILING connections between genotype, phenotype, and fitness in natural populations. *Molecular ecology*, 28(8), 1866-1876.

Dhawanjewar, A.S., Montooth, K.L., & Meiklejohn, C.D. Mitochondrial OXPHOS genes exhibit higher levels of molecular compensation of human disease associated mutations relative to nuclear OXPHOS genes in mammals. *In preparation, manuscript available on request*

Dhawanjewar, A.S., Montooth, K.L., & Meiklejohn, C.D. Evidence of mito-nuclear molecular coevolution in mammalian genomes *In preparation, manuscript available on request*

* Equal contribution

WEB-SERVERS

Prediction of Stable Quaternary Protein Assemblies -

PIZSA (Protein Interaction Z-score Assessment) - <http://cospi.iiserpune.ac.in/pizsa/>

Experience

Evolution of sexually antagonistic variation in fruit flies

UNIVERSITY COLLEGE LONDON

2022-Present

UK

- Integrate the experimental and computational aspects of investigating sexual antagonistic variation
- Experimental evolution to identify sexually antagonistic loci through sex-limited selection in fruit flies
- Genome-wide Pool-seq approach to track allele frequencies over time combined with Approximate Bayesian Computation (ABC) to estimate evolutionary parameters for sexually antagonistic loci

Estimating levels of molecular compensation in the oxidative phosphorylation system

2019-2022

UNIVERSITY OF NEBRASKA-LINCOLN

USA

- Constructed computational pipeline to identify instances where mitochondrial disease-causing mutations are present as native residues in 1200 mammalian species
- Performed sequence correlation analysis using corrected mutual information to characterize inter- and intra-genomic correlations
- Constructed phylogenies and performed ancestral state reconstruction to identify potential compensating residues
- Built protein structural models using homology modelling to identify nature of structural compensation
- Ran protein stability estimations for characterizing the effect of disease-causing mutations on overall protein stability

Mitochondrial-Nuclear interactions and the thermal sensitivity of male reproduction

2016-2019

UNIVERSITY OF NEBRASKA-LINCOLN

USA

- Characterized thermal male sterility for a panel of six hybrid Mitochondrial-Nuclear genotypes combining mitochondrial and nuclear DNA from *Drosophila melanogaster* and *Drosophila simulans*
- Assayed male fertility in a factorial design across three different temperatures and with males raised on three different diets to identify environmental effects on male fertility
- Ran mixed-model linear regressions to analyse the variance of genetic as well as environmental effects on male fertility results
- Found significant GxGxExE interactions shaping sharp thermal sterility thresholds in *Drosophila*

Prediction of stable quaternary assemblies - Protein Interaction Z Score Assessment (PIZSA)

2013-2015

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH, PUNE

India

- Constructed knowledge-based statistical potentials trained over 4900 native three-dimensional protein structures
- Derived a scoring scheme based on the statistical potentials and a binary classification scheme for identification of native protein quaternary structures
- Extensively bench-marked across multiple test sets and is among the top 6 methods, outperforming 31 other statistical, physics, based and machine learning scoring schemes
- Deployed the algorithm as a web-server

Honors & Awards

Blair Paxton Udale Fund for Life Sciences, The University of Nebraska Foundation (\$1900)	2021
Milton E. Mohr Fellowship, UNL Center for Biotechnology (\$1000)	2021
Blair Paxton Udale Fund for Life Sciences, The University of Nebraska Foundation (\$500)	2020
Milton E. Mohr Fellowship, UNL Center for Biotechnology (\$1000)	2019
Suzanne O. Prather Memorial Fund, University of Nebraska Foundation (\$1500)	2019
Runner-Up Best Poster Award, School of Biological Sciences, UNL (\$50)	2019
AAAS/Science Program for Excellence in Science, American Association for the Advancement of Science	2019
Jessie A. Lee Fund, School of Biological Sciences, UNL (\$2000)	2018
Best Poster Award, School of Biological Sciences, UNL (\$100)	2018
Conference Registration Award, Society for Molecular Biology and Evolution (\$450)	2018
Travel Grant, Society for Molecular Biology and Evolution (\$250)	2017
Runner-Up Best Poster Award, School of Biological Sciences, UNL (\$50)	2017
Mary D. Rogick Memorial Fund, School of Biological Sciences, UNL (\$1300)	2017
Travel Grant, Society for the Study of Evolution (\$500)	2016
Blair Paxton Udale Fund for Life Sciences, The University of Nebraska Foundation (\$1500)	2016
Rosemary Grant Award, Society for the Study of Evolution (\$2500)	2016
Travel Grant, The Indian Institute of Science Education and Research, Pune (\$1300)	2014
Travel Grant, The American Society of Naturalists (\$250)	2014
Working Internship, Max Planck Institute for Evolutionary Biology (\$3500)	2013
INSPIRE Scholarship, Department of Science and Technology, India (\$8000)	2010
National Talent Search Examination (NTSE) Scholar, NCERT, India (\$250)	2006

Conference Presentations

INVITED TALKS

The Ethics of Using Genetic Tools for Conservation

UNVEIL SYMPOSIUM 2018

Jun 2018

Missoula, Montana, USA

Population Genomics of the Range-Expanding Populations of *Argiope bruennichi*

20TH INTERNATIONAL CONGRESS OF ARACHNOLOGY

Jul 2016

Golden, Colorado, USA

ORAL PRESENTATIONS

Compensatory Evolution of Disease Associated Residues in the Oxidative Phosphorylation (OXPHOS) pathway *

SOCIETY FOR MOLECULAR BIOLOGY AND EVOLUTION MEETING

Jun 2020

Québec City, Canada

Environmental Modification of Mitochondrial-Nuclear Epistasis in Shaping Thermal Male Sterility in *Drosophila*

UNVEIL SYMPOSIUM 2018

Jun 2018

Missoula, Montana, USA

Mitochondrial-Nuclear Interactions and the Thermal Sensitivity of Male Reproduction

MITOCHONDRIAL GENOMICS AND EVOLUTION, AN SMBE SATELLITE MEETING

Sep 2017

Ein Gedi, Israel

POSTER PRESENTATIONS

Compensatory Evolution of Disease Associated Residues in the Mitochondrial Genome

2ND UNVEIL SYMPOSIUM 2019

Oct 2019

Lincoln, Nebraska, USA

Structural Compensation of Disease Associated Residues in the Mitochondrial Genome

EUROPEAN SOCIETY FOR EVOLUTIONARY BIOLOGY MEETING

Aug 2019

Turku, Finland

Mitochondrial Diseases and Compensated Pathogenic Deviations

SOCIETY FOR INTEGRATIVE AND COMPARATIVE BIOLOGY MEETING

Jan 2019

Tampa, Florida, USA

Genetic and Environmental Factors Underlying the Thermal Sensitivity of Male Reproduction

SOCIETY FOR MOLECULAR BIOLOGY AND EVOLUTION MEETING

Jul 2018

Yokohama, Japan

Mitochondrial-Nuclear Interactions and the Thermal Sensitivity of Male Reproduction

UNIVERSITY OF NEBRASKA-LINCOLN SPRING RESEARCH FAIR

Apr 2017

Lincoln, Nebraska, USA

Mitochondrial-Nuclear Interactions and the Thermal Sensitivity of Male Reproduction

58TH ANNUAL DROSOPHILA RESEARCH CONFERENCE

Mar 2017

San Diego, California, USA

Prediction of Protein-Protein Interactions through the use of Statistical Potentials

BIOPHYSICS PASCHIM MEETING

Mar 2015

Mumbai, India

Comparative Mitogenomic Analysis in the Range-Expanding Populations of *Argiope bruennichi*

QEVOLUTION2014, WORKSHOP ON QUANTITATIVE EVOLUTIONARY BIOLOGY

Sep 2014

Şirince, Turkey

* Conference cancelled due to COVID-19 concerns

Outreach

Organiser & Lightning Talks and Film Festival Master of Ceremonies, SciComm 2020	2020
My Captain Discover Mentor, The Climber	2018
Scientists in Cars Getting Coffee, Film Festival, SciComm 2018	2018
Master of Ceremonies, Lighting Talks and Film Festival, SciComm 2018	2018
Boys and Girls Science Club, Park Middle School, Lincoln Community Learning Centers	2016-2017
Junior Sunday with a Scientist, Nebraska State Museum	2017
Sunday with a Scientist: Diversity of Life in Nebraska, Nebraska State Museum	2017
Sunday with a Scientist: Darwin Day, Nebraska State Museum	2017
Science Night Live Moderator, SciComm 2016	2016
Sunday with a Scientist: Evolution on the Wing, Nebraska State Museum	2016
Junior Sunday with a Scientist, Nebraska State Museum	2016
Investigate: Show-and-tell Amblypygi, Nebraska State Museum	2016
Science Tutoring for less-privileged high school students, Pune, India	2013-2015