

Abhilesh Dhawanjewar

PH.D. CANDIDATE · EVOLUTIONARY BIOLOGY

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Education

Ph.D. in Evolutionary Biology

UNIVERSITY OF NEBRASKA-LINCOLN, USA

Advisors: Dr. Kristi Montooth & Dr. Colin Meiklejohn

Expected 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., Vellotta, J.P., **Dhawanjewar, A.S.**, & Schweizer, 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*

* Equal contribution

WEB-SERVERS

Prediction of Stable Quaternary Protein Assemblies -

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

Experience

Estimating levels of molecular compensation in the oxidative phosphorylation system

UNIVERSITY OF NEBRASKA-LINCOLN

2019-2021

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 GxGxExExE 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

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| 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

Jun 2018

UNVEIL SYMPOSIUM 2018

Missoula, Montana, USA

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

Jul 2016

20TH INTERNATIONAL CONGRESS OF ARACHNOLOGY

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

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| 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, Lightning 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 |

Teaching

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| Teaching Assistant, LIFE 120L - Fundamental Biology Lab I | Fall 2021 - Spring 2022 |
| Guest Lecture, BIOS 897- Communicating Science Through Outreach | Spring 2017, 2018 |
| Teaching Assistant, LIFE 121L - Fundamental Biology Lab II | Fall 2020 |
| Teaching Assistant, LIFE 120L - Fundamental Biology Lab I | Spring 2019 |
| Teaching Assistant, LIFE 120L - Fundamental Biology Lab I | Fall 2016 - Fall 2017 |
| Teaching Assistant, BIOS 101L - General Biology Lab | Fall 2015 - Spring 2016 |

Professional Service

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| Organizing Committee, SciComm 2020: A Conference on Effective Science Communication | 2020 |
| Graduate Student Representative, UNL oSTEM Conference 2020 | 2020 |
| Workshop co-organizer: Ethics of Biotechnology Applications to Conservation Biology, UNVEIL Symposium 2018 | 2018 |
| Grad Student Volunteer, Strategic Vision Committee, School of Biological Sciences, UNL | 2018 |
| Vice President, Biology Graduate Students Association, UNL | 2017-2019 |
| Undergraduate Poster Judge, UNL Spring Research Fair | 2018-2021 |

Memberships

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| Society for Molecular Biology and Evolution (SMBE) | 2018-2022 |
| European Society for Evolutionary Biology (ESEB) | 2019-2020 |
| The Society for Integrative and Comparative Biology (SICB) | 2019-2020 |
| American Association for the Advancement of Science (AAAS) | 2019-2020 |
| Genetics Society of America (GSA) | 2017-2019 |
| Society for the Study of Evolution (SSE) | 2016-2019 |
| International Society of Arachnologists (ISA) | 2016-2017 |
| American Society of Naturalists (ASN) | 2014-2015 |

References

Dr. Kristi Montooth

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Dr. Colin Meiklejohn

UNIVERSITY OF NEBRASKA-LINCOLN, USA

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Dr. M.S. Madhusudhan

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