PERSONAL INFORMATION

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Languages spoken: English, Hindi, Bangla, Marathi, Oriya

EDUCATIONAL QUALIFICATION

Doctor of Philosophy, National Centre for Biological Science, TIFR, 26/02/2021 Master of Science, Institute of Bioinformatics and Biotechnology, University of Pune, 01/06/2013

PROFESSIONAL EXPERIENCE

Assistant Professor, Centre for Ecological Sciences, Indian Institute of Science, Bangalore, India, October 2024-Present

Adjunct Faculty, Department of Biology, Pwani University, Kilifi, Kenya, February 2024-Present Research Affiliate, University of Glasgow, Glasgow, UK, 15/11/2023-Present

Post-doctoral Fellow, University of Copenhagen Copenhagen, Denmark, 15/11/2023 01/10/2024 Research Associate, University of Glasgow, Glasgow, UK, 15/2/2021-15/11/2023

Consultant (Bioinformatics and Genomics), National Centre for Biological Science, TIFR, Bangalore, India, 01/01/2021-01/10/2024

Consultant (Bioinformatics and Genomics), Penn State University, PA, USA, 01/08/2020-15/10/2022

EXPERTISE

Big data, genomics, population genetics, bioinformatics, wildlife studies, environmental DNA, genetic resources, outreach

PUBLICATIONS (*Reverse chronological order*, *Equal contribution, *Corresponding author, `Student trained)

Mellya, R.V., Hopcraft, J.G.C., Mwakilema, W., Eblate, E.M., Mduma, S., Mnaya, B., Chuma, I., Macha, E.S., Wambura, D., Fyumagwa, R. and Kilbride, E., Mable, B.K.*, **Khan, A.*** 2025. Natural dispersal is better than translocation for reducing risks of inbreeding depression in eastern black rhinoceros (Diceros bicornis michaeli). *bioRxiv*, pp.2023-06 (*PNAS*, accepted).

We find that translocation of captive individuals to the wild is not the best solution for genetic rescue. Natural dispersal of wild individuals is best solution to ensure populations persist into the future as they have purged out their deleterious allele load.

Khan, A. *, Yulianto, Y., Aninta, S.G. and Wirdateti, W., 2025. Reanalysis of sequences of alleged Javan tiger highlights the difficulties in studying big cats and the need for high throughput sequencing. *Oryx*, doi:10.1017/S0030605324001297

We find evidence of a tiger from Ssundaland lineage present in Java where tigers have been extinct for more than 50 years.

Khan, A. *, Carter, R., Mpamhanga, C.D., Masiga, D., Channumsin, M., Ciosi, M., Manangwa, O., Mramba, F., Ijaz, U.Z., Auty, H. and Mable, B.K., 2025. Swatting flies: Biting insects as non-invasive samplers for mammalian population genomics. *Molecular ecology,* doi:10.1111/mec.17661 We demonstrate that whole genomes of wild mammals like elephants can be sequenced from DNA extracts of blood sucking insects like tsetse flies.

Garcia-Erill, G., Wang, X., Rasmussen, M.S., Quinn, L., **Khan, A.**, Bertola, L.D., Santander, C.G., Balboa, R.F., Ogutu, J.O., Pecnerova, P. and Hanghoej, K., *et al.*, 2024. Extensive population structure highlights an apparent paradox of stasis in the impala (Aepyceros melampus). *Molecular ecology*, doi:

10.1111/mec.17539

We explore the genetic reasons behind evolutionary stasis of Impalas. Several genetic clusters are identified.

Khan, A.**, Sil, M.*, Thekaekara, T., Sinha, I., Khurana, R., Sukumar, R.* and Ramakrishnan, U. *, 2023. Serial dilution shapes genetic variation and defines conservation units in Asian elephants. *Current Biology*, doi: 10.1016/j.cub.2024.08.062

We find that Asiatic elephants in India underwent multiple founding events and probably colonized India in a north to south direction. This is led to lowering of genetic diversity and deleterious allele load among the Indian elephants from north to south.

Shukla, H.*, Suryamohan, K.*, **Khan, A.***, Mohan, K., Perumal, R., Mathew, O., Menon, R., Dixon, M.D., Muraleedharan, M., Kuriakose, B., Michael, S., Krishnakutty S.P., Zachariah, A., Seshagiri, S., Ramakrishnan, U., 2023. Near-chromosomal de novo assembly of Bengal tiger genome reveals genetic hallmarks of apex-predation. *Gigascience*, *12*(*giac112*), DOI: 10.1093/gigascience/giac112 We assemble chromosome level reference genomes of two Bengal tigers and the signatures of adaptations in tiger genomes that make them apex predators.

Khan, A., 2022. The year of the tiger and the year of the tiger genomes!. *Molecular Ecology Resources*, DOI: 10.1111/1755-0998.13726

I review the recent advances in the genome assemblies of tigers and the whole genome sequences that are available. This is comprehensive guide to finding all the tiger genome assemblies available till date and helps choose the right assembly for genome analysis.

Khan, A.**, Swathy Krishna M., Ramakrishnan, U., Das, R. **, 2022. Recapitulating whole genome-based population genetic structure for Indian wild tigers through ancestry informative marker panel. *Heredity*, *128* (88-96)

We find that individuals from small isolated populations can be mapped accurately to the right geographical location even with few random markers. We further develop a SNP based ancestry informative marker panel to assign Indian tigers to their specific genetic cluster and geographic locations.

Tyagi, A., **Khan, A.**, Thatte, P., Ramakrishnan, U., 2022. Genome-wide SNPs from fecal samples reveal the anthropogenic impacts on connectivity: A case of Jungle cat (*Felis chaus*) in central Indian landscape. DOI: 10.1111/acv.12770 *Animal conservation*

We demonstrate that next-generation sequencing based methods can be applied effectively to samples collected from past landscape genetics studies. This also yields greater insights can previous methods.

Armstrong, E.**, **Khan, A.***, Taylor, R.W., Gouy, A., Greenbaum, G., Thiery, A., Kang, J.T., Redondo, S.A., Prost, S., Barsh, G., Kaelin, C., Phalke, S., Chugani, A., Gilbert, M., Miquelle, D., Zachariah, A., Borthakur, U., Reddy, A., Louis, E., Ryder, O., Jhala, Y., Petrov, D., Excoffier, L., Hadly, E., Ramakrishnan, U. #, 2021. Recent evolutionary history of tigers highlights contrasting roles of genetic drift and selection. *Molecular Biology and Evolution*, *38*(*6*), *pp. 2366-2379* The work quantifies the global distribution of genetic variation in tigers, their inbreeding, demographic history and the selection on genomes. We show that Bengal tigers have the highest genetic variation but also have the most inbred tigers. Additionally, the tiger subspecies were formed only as recently as 20,000 years ago.

Khan, A.*#, Patel, K.^, Shukla, H.^, Vishwanathan, A., van der Valk, T., Borthakur, U., Nigam, P., Zacchariah, A., Jhala, Y.V., Kardos, M.*, Ramakrishnan, U.*, 2021. Genomic evidence for inbreedingdepression and purging of deleterious genetic variation in Indian tigers. *Proceedings of the National Academy of Sciences*, 118(49), e2023018118

The work shows that differences in genetic variation and inbreeding in tigers is a function of the population size. Additionally, the small isolated populations have lower deleterious allele loads than

large connected populations. However, whatever deleterious alleles remain are high in frequency and homozygosity.

Khan, A.*#, Tyagi, A., 2021. Considerations for initiating a wildlife genomics research project in south and south-east Asia. *Journal of the Indian Institute of Science, 101(2), pp. 243-256* We review the challenges faced by labs in south and south-east Asia in starting their own wildlife genomics projects. We review the limitations in expertise, infrastructure, funding and policies that limit the exploration of some of the most biodiverse regions of the world.

Khan, A.*#, Patel, K.^, Bhattacharjee, S., Sharma, S., Chugani, A.N., Sivaraman, K., Hosawad, V., Sahu, Y.K., Reddy, G.V. and Ramakrishnan, U.*, 2020. Are shed hair genomes the most effective noninvasive resource for estimating relationships in the wild? DOI: 10.1002/ece3.6157 *Ecology and Evolution*

We develop a method to sample and sequence whole genomes of wild individuals from few strands of shed hair.

MANUSCRIPTS IN PREPARATION

Khan, A.**, Rodriguez, R.*^, Tyagi, A., Sukmasuang, R., Bhumppakphan, N., Jenks, K., Sognsasen, N., Zachariah, A., Jhala, Y., Srivathsa, A., Ramakrishnan, U.*, Genomic insights and phylogeography help identify range-wide conservation units for the endangered Asiatic wild dog, *Proc. Roy. Soc. B.* (in review)

Tensen, L.*, Khan, A.*, Sarabia, C., Bishop, J., Camacho, G., Fischer, K., Williams, K.S., Genomic divergence of leopards in the Cape Floristic Region of South Africa: potential drivers of local adaptation, *Molecular Ecology (in review)*

Wang, X., Nursyifa, C., Aninta, S.G., Garcia-Erill, G., Bertola, L.D., Khan, A., *et al.*, Multiple origins and adaptive introgression shaped the unique diversity of Indonesian cattle, *Nature communications* (revision in review)

Wang, X., Aninta, S.G., Garcia-Erill, G., Li, Z., Khan, A., et al., Population structure and domestication history of the Javan banteng (Bos javanicus javanicus), Current Biology (revision in review)

Liu, X., Sinding, M.S., Lacerda, B., Aninta, S.G., Schubert, M., Bøggild, T., Bertola, L.D., Khan, A., Agwanda, B., Seigismund, H.R., Helgen, K.M., Barnes, I., Albrechtsen, A., Ogutu, J.O., Heller, R., Moltke, I., Spot the difference: resolving the mystery of the marozi, *PNAS (Submitted)*

Pečnerová, P., Ishida, Y., Garcia-Erill, G., Bertola, L.D., Santander, C.G., Liu, X., Brüniche-Olsen, A., Khan, A., *et al.*, The genomic impact of connectivity and decline in Africa's elephants, *Nature communications (Submitted)*

Parreira, B.R., Pečnerová, P., Tensen, L., Aninta, S.G., Brüniche-Olsen, A., Khan, A., et al., Inbreeding and its implications for conservation, BMC Biology (Submitted)

Khan, A.*, Reducing the disparity in global wildlife genomics research, in preparation

Elsner-Gearing, F.^, Shultz, S., Kretzschmar, P., Pilgrim, M., Hruby, J., King, T., Walton, C.*, Khan, A.*, The Trojan Rhino: admixture, mutational load and purging in populations of the critically endangered Eastern black rhino, *in preparation*

GRANTS

Anubhab Khan. Estimating contemporary extinction and survival in small isolated wild populations

with direct estimates of phenotype using deep learning (2025). Grant: Schmidt and Wendy faculty fellowship for AI in science

Funding agency/organization: Schmidt Sciences

Amount: INR 1 crore equivalent (GBP 48,000 fellowship + GBP 30,000 grant)

Anubhab Khan and Umesh Srinivasan. Understanding the population biology of the critically endangered point endemic, the Bugun Liocichla, to design effective conservation strategies (2025).

Grant: THT Conservation Grant

Funding agency/organization: The Habitats Trust

Amount: INR 1 crore

Anubhab Khan. Genomic basis for rapid evolution of extremely divergent polygenic traits in large

vertebrates (2025). Grant: ANRF ECRG

Funding agency/organization: ANRF

Amount: INR 72 lakhs

Anubhab Khan. Understanding survival and extinction of small isolated populations (2024).

Grant: Seed grant

Funding agency/organization: IISc

Amount: INR 1.045 crore

RESEARCH EXPERIENCE

1. Postdoctoral Scholar: Section for Computational and RNA Biology, University of

Copenhagen, Copenhagen **Guide:** Dr. Rasmus Heller

Topic: Population structure and hybridization among cows, antelopes and hippo

2. Postdoctoral Scholar: School of Biodiversity, One Health and Veterinary Medicine,

University of Glasgow, Glasgow

Guide: Prof. Barbara Mable, Dr. Harriet Auty

Topic: What can you learn from a fly?

3. Bioinformatics Consultant: Department of Anthropology, Penn State University,

Pennsylvania

Guide: Dr. George Perry

Topic: Estimating origins of human cooking behaviour

4. Visiting Scholar: Institute of Evolutionary Biology, School of Biological Sciences,

University of Edinburgh, Edinburgh **Guide:** Prof. Josephine Pemberton

Topic: Estimating pedigrees of wild tigers from incomplete datasets

5. Visiting Student: Department of Biology, Stanford University, California

Guide: Dr. Uma Ramakrishnan, Prof. Elizabeth Hadly and Prof. Dimitri Petrov

Topic: Mapping Genetic variation in tigers

6. Research Scholar: Population genetics and conservation Lab, National Centre for biological

Science, TIFR. Bangalore **Guide:** Dr. Uma Ramakrishnan

Topic: Studying inbreeding in tiger populations

7. Junior Research Fellow: Neural circuit development Lab, National Centre for Biological

Science, TIFR. Bangalore **Guide:** Dr. Vatsala Thirumalai

Topic: Do gap junctions synapses instruct the formation of chemical synapses during brain

development?

8. Master Thesis: National Chemical Laboratory, Pune and Dept. of Zoology, University of

Pune

Guide: Dr. Anuya Nisal and Prof. B.B. Nath

Topic: Investigation and characterization of aquatic midge-silk protein for potential

applications

9. NIUS Fellowship: HBCSE, TIFR, Mumbai and Dept. of Zoology, University of Pune

Guide: Prof. B.B. Nath and Prof. Rekha Vartak

Topic: Abberent behavior of *Drosophila* with mutations of potentially non-sexual traits

10. Internship: Sparkler Ceramics, Pune and Department of Zoology, University of Pune

Guide: Prof. B.B. Nath

Topic: Effects of ultrasonic sound on chromosomes

11. Summer Project: Bhabha Atomic Research Centre (B.A.R.C), Mumbai

Guide: Dr. Rita Mukhopadhyay

Topic: Overexpression of tentative transcription expression genes in *Deinococcus* radiodurans to assess their role in controlling DNA repair after exposure to gamma rays

12. KVPY Project: Institute of Bioinformatics an Biotechnology, University of Pune

Guide: Prof. B.A. Chopade

Topic: Developing plasmid curing agents using novel phytochemicals

13. Short term projects:

- a. Theoretical modeling of acoustical behavior of various organisms.
- b. Designing ultrasonic tranducers with help from Sparkler Ceramics Ltd., Bhosari, Pune
- c. Designing water purification process and instruments using biological principles.

TEACHING EXPERIENCE

- 1. Population Genomics, Pwani University, Kilifi, 2024
- 2. Conservation Genomics, Application of genomics in wildlife conservation, Bogor, 2023
- 3. Population Genomics, Pwani University, Kilifi, 2023
- 4. Conservation Genomics workshop, Pre-conference module, 31st International Congress for Conservation Biology, Kigali, 2023
- 5. Genetics of Complex Traits and Disorders, University of Glasgow, Glasgow, 2023
- 6. Conservation Genetics, University of Glasgow, Glasgow, 2022
- 7. Genetics and Bioinformatics Workshop, HABAKA Madagascar Innovation Hub, Madagascar, 2021
- 8. Evolution and Biogeography, NCBS, Bangalore, 2020
- 9. Emperical Population Genetics, Preparatory School on Population Genetics and Evolution ICTS, Bangalore, 2019
- 10. Conservation Genomics workshop, Student Conference on Conservation Science, Bangalore, 2018
- 11. Conservation Genomics workshop, Student Conference on Conservation Science, Bangalore, 2017

ACHIEVEMENTS AND FELLOWSHIPS

- 1. One-off meeting grant to conduct conservation genomics workshop in Kigali, 2023
- 2. SBOHVM grants to attend SMBE satellite meeting on Molecular Evolution in Small Isolated Populations in Princeton, 2023
- 3. Conference Grant Scheme B from Genetics Society for attending ESEB meeting in Prague, 2022
- 4. Travel Grant from NCBS for best poster award in Ecology and Evolution for presentation in Zooming through biology in Bangalore, 2021
- 5. Travel Grant from SciGenome Research Foundation to attend NGBT in Jaipur, 2018
- 6. Travel Grant from SCCS Cambridge for Internship for studying "Recovering pedigrees from wild tigers using incomplete datasets", 2017
- 7. Library preparation kits and support from Dovetail genomics to start Whole genome assembly of endangered species in India, 2018
- 8. Travel Grant from SciGenome Research Foundation to attend NGBT in Bhubaneswar, 2017
- 9. SciGenome Foundation Genomic Project grant for "Genetic variation, inbreeding and pathogenic load of Semi-Arid population of tigers in India", 2016
- 10. Infosys Travel Grant for Collaborative Visit for studying "Genetic variation and Inbreeding in tigers using NGS tools" at Stanford University, 2016
- 11. Travel Grant from Welcome trust to attend workshop on "Human and Vertebrate Genomics: Tools and online Resources", Mahidol University, Bangkok, 2016
- 12. Travel Grant from Society for Ethology and Evolution to present poster in "National Conference on Ethology and Evolution", Mohali, 2015
- 13. Research support from Sparkler Ceramics, Bhosari Pune for "Chromosomal Effects of Ultrasonic Sound", 2012
- 14. NCBS-TIFR, Department of Atomic Energy, Research Scholarship, 2014
- 15. CSIR-UGC National Eligibility Test 2012 qualified with CSIR JRF rank 43 (Exam conducted by the Ministry of Human Resource Development, Govt. of India)
- 16. Graduate Aptitude Test In Engineering 2014 qualified in life sciences with all India rank of 9 (Exam conducted by National Coordination Board GATE, Department of Higher Education, Ministry of Human Resource Development (MHRD), Government of India
- 17. Indian Council of Medical Research, Junior Research Fellow qualified with all India rank of 40 (Exam conducted by Indian council of Medical Research, Government of India)
- 18. Won silver medal in Asian Science Camp for poster presentation, 2010 (Organized by Asian Science Camp International Board)
- 19. National Initiative for Undergraduate Science, TIFR, fellowship, 2010
- 20. Won the best thesis award in category for third year project towards partial fulfilment of MSc degree, 2011
- 21. Won first prize in oral presentation in a competition titled "Innovative Ideas In Evolutionary Biology" Organized By I.A.B.T., H.B.S.C.E., 2011
- 22. Won first prize in poster competition at IBB students annual conference in biotechnology, 2011
- 23. Won first prize in science model competition during the nation science day celebration organised by I.B.B., 2012
- 24. Won second position at a national level science exhibition visited by many foreign delegates and the then president of India Dr. A.P.J. Abdul Kalam
- 25. Centre topper of national biology olympiad organised by iabt
- 26. Passed the senior level U.N. Information Test organized by UNESCO
- 27. Passed the Homi Bhabha Bal Vaigyanik Examination
- 28. Passed the junior level U.N. Information Test Organized By UNESCO
- 29. Passed the primary level Green Olympiad

CONFERENCES AND SEMINARS

- 1. 31st International Congress for Conservation Biology, Kigali, 2023 (Talk)
- 2. 59th Annual Meeting of the Association for Tropical Biology and Conservation, Coimbatore, 2023 (Talk)

- 3. SMBE satellite meeting on Molecular Evolution in Small Isolated Populations, Princeton, 2023 (Poster)
- 4. European Conservation genetics Meeting, Edinburgh, 2022 (Short talk)
- 5. Congress of European Society for Evolutionary Biology, Prague, 2022 (Talk)
- 6. 30th International Congress for Conservation Biology, Online, 2021 (Talk)
- 7. Zooming through Biology, Bangalore, 2021 (Best poster award in Ecology and Evolution)
- 8. Student Conference on Conservation Science, Bangalore, 2019 (Workshop Conducted)
- 9. 29th International Congress for Conservation Biology, KLCC, Kuala Lumpur, 2019 (Poster
- 10. Presentation)
- 11. Preparatory School on Population Genetics and Evolution, ICTS, Bangalore, 2019 (Resource Person)
- 12. Nextgen Genomics, Biology, Bioinformatics and Technologies Conference, Jaipur, 2018 (Poster Presentation)
- 13. Student Conference on Conservation Science, Bangalore, 2018 (Workshop Conducted)
- 14. Student Conference on Conservation Science, Cambridge University, Cambridge, 2018 (Poster Presentation)
- 12. Plant and Animal Genome XXVI Conference, San Diego, 2018 (Poster Presentation)
- 13. Nextgen Genomics, Biology, Bioinformatics and Technologies Conference, Bhubaneswar, 2017 (Poster Presentation)
- 15. Student Conference on Conservation Science, Bangalore, 2017
- 16. Third Bangalore School on Population Genetics and Evolution, ICTS, Bangalore, 2016 (Poster Presentation)
- 14. Second Bangalore School on Population Genetics and Evolution, ICTS, Bangalore, 2016 (Poster Presentation)
- 15. Welcome Genomics Centre workshop on "Human and Vertebrate Genomics: Tools and online Resources", Mahidol University, Bangkok, 2016
- 16. Student Conference on Conservation Science, Bangalore, 2016
- 17. National Conference on Ethology and Evolution, IISER Mohali, Mohali, 2015 (Poster Presentation)
- 18. Winter School on "Analysis of Massively Parallel Sequencing (NGS) data" at NIBMG, Kalyani, 2015
- 19. International Symposium on Proteomics Beyond Ids & Fourth Annual Meeting of Proteomics
- 20. Society, CSIR-National Chemical Laboratory, Pune, 2012
- 21. IBB students annual conference in biotechnology, University of Pune, Pune, 2011 (organized)
- 22. Dealing with evolution in the classroom: evolutionary perspectives in modern biological teaching and research, HBCSE, Mumbai, 2011 (organized)
- 23. Lecture sessions by Dr. Manda Claire Jost on evolutionary biology, University of Pune, Pune, 2011 (organized)
- 24. IBB Students Annual Conference in Biotechnology, University of Pune, Pune 2011 Frontiers in Physics-IV, Pune, 2011
- 30. Asian Science Camp, Mumbai, 2010 (Asian Science Scholar, Silver Medal)
- 31. National Laser Symposium, BARC, Mumbai, 2010
- 32. National Conference On Recent Trends In Biotechnology And Industry- Academia Interaction, University of Pune, Pune 2010
- 33. Frontiers In Physics-III, Pune, 2010
- 34. Mahabio conference, University of Pune, Pune, 2009 (organized)
- 35. Frontiers In Physics-II, Pune, 2009

OTHER SKILLS

- 1. Negotiation skills. Negotiated sequencing costs down by 31.25%; obtained sequencing supplies from companies for free; obtained special permissions from forest departments
- 2. Leading projects with large multinational, multi institutional and diverse groups.
- 3. Initiate collaborations. Initiated collaborations with NGOs (WCS, CWS, NCF, Panthera), Academic institutions (University of Edinburgh, Uppsala University, University of Montana, University of Missouri, Wildlife Institute of India), Government Department (Rajasthan Forest

Department), Companies (Genentech, MedGenome, SciGenome)

- 4. Field work in remote location. Worked in Ranthambore Tiger Reserve, Sariska Tiger Reserve, Tal Chappar
- 5. 6. Established a field station for research in Ranthambore Tiger Reserve Co-ordinate and manage teams remotely. Managed a field team in Rajasthan for 4 years from Bangalore.
- 7. Teaching skills. Taught Population genetics to graduate students at ICTS. Conducted workshop on conservation genomics for graduates at SCCS, Bangalore.
- 8. Mentorship skills. Mentored several undergraduates and graduates; trained forest guards for the Rajasthan Forest Department.