ANOOB PRAKASH

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PROFESSIONAL PROFILE

Highly skilled researcher with expertise in ecological and evolutionary genomics, plant biology, climate change and bioinformatics. Experienced in analyzing large-scale genomic data, conducting climate change adaptation studies, and teaching advanced scientific concepts. Adept at both independent and collaborative research in academic and non-academic settings.

EDUCATION

2018-Present	Ph.D. candidate (expected end date: September, 2025), Plant Biology, University of Vermont
	Advisor: Dr. Stephen R. Keller
2011-2014	M.Sc. Tree Physiology and Breeding, Kerala Agricultural University
	Advisor: Dr. A.V. Santhoshkumar
2007-2011	B.Sc. Forestry, Kerala Agricultural University
	Advisor: Dr. T.K. Kunhamu

RELEVANT SKILLS AND EXTRACURRICULARS

Technical Skills

Programing and Scripting: R (proficient), Unix/Linux (proficient), Python (basic).

Data tools: ArcGIS (advanced), QGIS (basic), Tidyverse (proficient).

Data Analysis and Bioinformatics:

- Management and analysis of large-scale genomic, phenotypic, and climate datasets
- Application of bioinformatic pipelines and climate forecasting methods
- Expertise in graphical data visualization

Communication and Design

Design and Visualization: Affinity Designer (proficient), Adobe Illustrator (proficient), Adobe After Effects (advanced).

Presentation and Documentation: MS Office, Quatro (proficient) and R-markdown (proficient).

Research and Field skills:

- Statistical data analysis
- Wet lab techniques
- Field data collection methodologies

Collaboration and Networking

- Built strong collaborative relationships with researchers at the University of Maryland
- Engaged with scientists, ecologists, and practitioners at The Nature Conservancy (Maryland, West Virginia, Virginia) and Central Appalachian Spruce Restoration Initiative (CASRI)

Leadership and Service

- Graduate Student Senator, Department of Plant Biology, University of Vermont (2018–2020)
- Captain, college basketball team - led team to Inter-collegiate Championship (2012)
- Assistant Hostel Secretary, College of Forestry, Kerala Agricultural University (2009)

RESEARCH AND PROFESSIONAL EXPERIENCE

The University of Vermont (UVM), USA 2018-Present

Graduate Research Assistant 2018-Present

Investigated genotypic and phenotypic variation and climate change adaptation in red spruce (Picea rubens Sarg.)

Project 1: Investigated genotypic variation and plasticity in climate-adaptive traits

- Quantified biomass and trait variance to identify patterns of genotypic and phenotypic responses to climate gradients utilizing quantitative genetics and Bayesian approaches.
- Collaborated with interdisciplinary teams to collect and manage large, multi-year datasets from multiple field sources.

Project 2: Unraveling the role of introgression in local adaptation

- Utilized molecular approaches to investigate the role of introgression underlying local adaptation.
- Identified patterns of local adaptation and climate adaptation in informing conservation strategies for fragmented red spruce populations.

Project 3: Understanding the molecular basis of local adaptation and forecasting species range in response to climate change.

- Utilized genome-wide association studies (GWAS) to detect loci underlying polygenic traits.
- Applied advanced bioinformatic approaches to assess genetic architecture of locally adaptive traits.

Graduate Teaching Assistant 2018-2025

Conducted course grading, instructed labs, report writing, peer-review process and setting up labs for wet and dry labs.

Taught Principles of Biology I and II (2018-2021)

- Trained students in understanding the process of science and concepts in genetics.
- Applying wet lab protocols, microscopy and molecular modelling approaches.

Taught Exploring Biology (2022-2023)

- Taught bench work for protein purification, enzyme purification, SDS-PAGE and gel analysis.

Taught Ecology and Evolution (2022-2025)

- Trained more than hundred students in general data collection protocol and data analysis in R.
- Mentored students in carrying out independent research projects.

The Nature Conservancy (TNC), USA 2021 & 2022

Graduate Research Intern

Applied genomic assisted seed source selection in identification of multiple viable seed sources for restoration of red spruce in the fragmented southern edge of the species distribution – resulting in over 58,000 seedlings planted in 3 US states.

- Data collection from experimental plots post restoration planting to monitor and assess the recommended genomic-assisted seed sourcing methodology at Virginia, West Virginia and Maryland
- The results were published in a peer-reviewed scientific journal and presented at national and international conferences.

The Kerala Agricultural University (KAU), India 2010-2016

Teaching Assistant 2014-2016

- Taught undergraduate and graduate students on courses like biochemistry, biotechnology, tree improvement, tree physiology, world forest systems, ecophysiology etc.
- Managed lab space, laboratory inventory, assisted students in bench work and writing for coursework and research.

Graduate Research Assistant 2011-2014

Investigated the impact of particulate pollution on growth, physiology, and anatomical properties of Tectona grandis and other moist deciduous tree species proximal to industries using field and laboratory methods. The results of this research were published in 2 scientific journals and presented at scientific conferences.

- Conducted comprehensive assessments of chlorophyll content, ascorbic acid levels, relative water content, and leaf pH to evaluate air pollution tolerance across multiple seasons.
- Analyzed dust accumulation rates, leaf surface area, leaf area index, and leaf area duration to quantify the effects of particulate pollution on tree health and productivity.
- Compared wood anatomical properties of pollution-exposed and control populations, identifying significant differences in wood quality and structure.

Independent Undergraduate Researcher 2010-2011

- Characterized structural and functional attributes of home gardens and made recommendations for integrated farming system models for medium and large-scale farmers
- Assisted the Assistant Conservator of Forest (A.C.F.) in drafting a working plan for Konni Forest Division, India, ensuring continuity of forest management policies for a 10-year period.
- Conducted site quality mapping, growing stock assessment, and regeneration surveys as part of forest management planning.

FELLOWSHIP

2023-2024 **GradCAMP Climate Scholar**, USDA and West Virginia State University

2018-2023 **National Science Foundation Research Traineeship (NRT) Trainee**, *Quantitative and Evolutionary STEM Training* (QuEST), University of Vermont

PEER REVIEWED PUBLICATION (*INDICATES RELATED TO DISSERTATION OR THESIS RESEARCH)

Publications

***Prakash, A.**, Lachmuth, S., Capblancq, T, Butnor, J., Johnsen, K., Fitzpatrick, M., Nelson, D. and Keller, S. (**in-prep for Molecular Ecology**). Unraveling the role of introgression on local adaptation in red spruce (*Picea rubens* Sarg.)

†Verrico, B.M., **†Prakash, A.**, Worthing, B., Munson, H., Capblancq, T., Bardsley, K., Kaufman, N., Seligmann, W. and Keller, S.R. (**in-prep for Tree Genetics & Genomics**). Transcriptomic response to combined heat and drought stress in seedling red spruce (*Picea rubens* Sarg.) († indicates co-first authors)

Prakash, A., Capblancq, T., Shallows, K., Saville, D., Landau, D., Landress, C., Jacobs, T. and Keller, S. (2024). Bringing genomics to the field: An integrative approach to seed sourcing for forest restoration. *Applications in Plant Sciences*, 12(3), e11600

Lachmuth, S., Capblancq, T., **Prakash, A.**, Keller, S. R., & Fitzpatrick, M. C. (2023). Novel genomic offset metrics integrate local adaptation into habitat suitability forecasts and inform assisted migration. Ecological Monographs, e1593.

***Prakash, A.**, DeYoung, S., Lachmuth, S., Adams, J.L., Johnsen, K., Butnor, J.R., Nelson, D.M., Fitzpatrick, M.C. and Keller, S.R., (2022) Genotypic variation and plasticity in climate-adaptive traits after range expansion and fragmentation of red spruce (*Picea rubens* Sarg.). *Philosophical Transactions of the Royal Society B*, 377(1848), 20210008.

Das, A., **Prakash, A.**, Dedon, N., Doty, A., Siddiqui, M. and Preston, J.C., (2021) Variation in climatic tolerance, but not stomatal traits, partially explains Pooideae grass species distributions. *Annals of botany*, 128(1), pp.83-95.

Raj, R. M., Raj, A. K., Kunhamu, T. K., and **Prakash, A**. (2019). Fodder yield and nutritive value of mulberry (Morus indica L.) under varying plant density and pruning frequency in coconut garden. *Range Management and Agroforestry*, 40(2), 255-261.

***Prakash**, A., Santhoshkumar, A. V., and Roby, P. C. (2017). Impact of particulate pollution on photosynthesis, transpiration and plant water potential of teak (Tectona grandis L.). *Current Science*, 1272-1276.

Raj, R. M., Raj, A. K., and **Prakash, A**. (2016). Fodder yield and nutritive value of subabul (Leucaena leucocephala Lam.) under diverse management regimes in coconut garden. *Indian Journal of Agroforestry*, 18(2), 79-85.

***Prakash, A**., Santhoshkumar, A. V., and Roby, P. C. (2016). Appropriateness of Moist Deciduous Species Against Particulate Pollution Abatement and Monitoring. *Int. J. of Sc., Environ. and Tech*, 5, 537-546.

Peer-review activities

Peer reviewed for scientific journals – **Journal of Heredity** (2025), **Molecular Biology and Evolution** (2025), **New Phytologist** (2024), **G3: Genes, Genomes, Genetics** (2023), **Ecological Monographs** (2022), **Frontiers in Plant Science** (2022)

CONFERENCE PRESENTATIONS

Conference Talks

"Unraveling the genetic architecture of local adaptation in species with a history of introgression"

2024 3rd Joint Congress on Evolutionary Biology, Montreal, QC, Canada

"Unraveling the effects of introgression on local adaptation in red spruce (Picea rubens Sarg.): Genetic rescue and shaping of adaptive traits"

2024 XXVI World Congress of the International Union of Forest Research Organizations (IUFRO), Stockholm, Sweden

"Understanding the role of introgression on local adaptation in red spruce (Picea rubens Sarg.)"

2024 UVM Student Research Conference, Burlington, Vermont, USA

"Exploring the drivers of selection in a range fragmented forest tree: A case study in red spruce (Picea rubens)."

2023 Evolution 2023, Albuquerque New Mexico, USA

"Detecting signals of polygenic adaptation in the face of demographic history and population structure in red spruce (Picea rubens SARG)"

2022 Botany 2022, Anchorage, Alaska, USA

"The evolution of species' ranges in the face of changing environments"

2021 Forest Genetics Student and PostDoc Symposium, Virtual

Outreach

"Using genomics to assist red spruce conservation and restoration under a changing climate"

2023 CASRI Annual Meeting, Davis, West Virginia, USA (Virtual)

"Science Sparks talk on Plant Biology"

2023 Science presentation for the youth (7-10 grade students), Science Olympiad at University of Vermont, Burlington, Vermont, USA

"Demographic history of red spruce and genotypic variation present in climate-adaptive traits after range expansion and fragmentation"

2021 National Science Foundation (NSF) funded Red Spruce Climate Change Workshop, Burlington, Vermont, USA

Poster Presentations

"Seeds of Hope: Sprucing up forest restoration with genomics"

2024 3rd Joint Congress on Evolutionary Biology, Montreal, QC, Canada

2024 Invited poster to College of Life Sciences CALS) and Food Systems Research Center (FSRC) -University of Vermont (UVM) Board of Trustees Breakfast and Poster session, Burlington, Vermont, USA

"Investigating population differentiation in red spruce (Picea rubens Sarg.*) due to climate change."*

2019 UVM Student Research Conference, Burlington, Vermont, USA

2019 Evolution, Providence, Rhode Island, USA

"Anatomical changes in the wood properties of Tectona grandis due to particulate pollution."

2015 National Biodiversity Congress, Thiruvananthapuram, Kerala, INDIA

"Vegetational composition and regeneration status of mangroves in Chetuwai backwaters, Kerala."

2014 Indian Biodiversity Congress, Chennai, Tamil Nadu, INDIA

TRAINING AND WORKSHOPS

2025 (June)	Computational Biology Upskilling workshop *by Dean Lee and Tommy Tang* The Festival of Genomics & Biodata
2025 (June)	Enhancing Variant Analysis and Interpretation *by Heidi Rehm and Suganthi Balasubramanian* The Festival of Genomics & Biodata
2025 (June)	Mastering Spatial Data Analysis: From Basics to Cutting-Edge Innovations *by Abdul Hassan Samee and Ilya Korsunsky* The Festival of Genomics & Biodata
2025 (June)	How to Better Computationally Analyze Your Single-Cell RNA Sequencing Data by *Gracie Gordon, Mary Piper, Meeta Mistry and Zhaleh Safikhani* The Festival of Genomics & Biodata
2025 (Jan)	Data and Open Science Summit The University of Vermont (UVM) and NASA
2024 (May)	Next Generation Sequencing Webinar HelixOmics Analytics
2024 (May)	Schrödinger's Educators week Schrödinger, NYC headquarters
2022 (July)	de novo genome assembly and annotation with an emphasis on phylogenetic and population genetic studies (Botany 2022 Conference)
2017 (Nov)	Echoes in Space - Introduction to RADAR Remote Sensing, EO College and the European Space Agency
2017 (July)	UAV Remote Sensing and Applications, Indian Institute of Remote Sensing (IIRS) and Indian Space Research Organization (ISRO)
2017 (June)	Conservation Genetics, Salim Ali Centre for Ornithology and Natural History (SACON)
2017 (April-May)	Statistics and R (PH525.1X), HarvardX and edX
2017 (Jan-March)	Introduction to Python for Data Science (DAT208X), Microsoft Corporation and edX
2016 (Feb-March)	Geospatial Technologies for Urban Planning, Indian Institute of Remote Sensing (IIRS) and Indian Space Research Organization (ISRO)
2016 (March)	Remote Sensing and GIS tools for natural resource management, College of Forestry, Kerala Agricultural University (KAU)
2015 (Aug-Nov)	Basics of Remote Sensing, Geographical Information System and Global Navigation Satellite System, Indian Institute of Remote Sensing (IIRS) and Indian Space Research Organization (ISRO)
2015 (Sept)	Introduction to Statistical Packages for Social Sciences (SPSS), College of Forestry, Kerala Agricultural University (KAU)
2015 (Nov-Jan)	Certificate Course in Geographic Information System, Centre for Geo Information Technology
2014 (Dec)	Two-day training on Geographic Information System, Centre for Geo Information Technology and Kerala GIS Community
2014	Opportunities and Challenges of Women in Agriculture of Kerala, College of Forestry, Kerala Agricultural University (KAU)
2013	Protection of Geographical Indications: Opportunities and legal paths, College of Forestry, Kerala Agricultural University (KAU)

GRANTS AND AWARDS

2024	CALS Graduate Student Enhancement Fund w/ hundred percent departmental match ($1200)
2024	Graduate College Conference Grant Program w/ hundred percent departmental match ($1200)
2022	UVM Graduate Student Senate Mini Grants w/ hundred percent departmental match ($600)
2019	CALS Graduate Student Enhancement Fund w/ hundred percent departmental match ($400)

TEACHING EXPERIENCE

2018-Present	**Graduate Teaching Assistant**, University of Vermont, USA
	Exploring Biology, 2022, 2023
	Ecology and Evolution, 2022, 2023, 2024 (spring and fall), 2025
	Principles of Biology 1, 2018, 2019, 2021
	Principles of Biology 2, 2019, 2020

2014-2016 **Graduate Teaching Assistant**, Kerala Agricultural University, INDIA

Forest Ecophysiology, 2013, 2014, 2015

Plant Biochemistry, 2013, 2014

Ethnobotany, 2015

Plant Biotechnology, 2015

World Forestry System, 2015

Principles of Tree Improvement, 2015

Elementary Tree Physiology, 2014, 2015

Medicinal and Aromatic Plants, 2015

Weapon Training and First Aid Training, 2014, 2015

PROFESSIONAL MEMBERSHIPS

Botanical Society of America (BSA), Society for the Study of Evolution (SSE), American Society of Naturalists (ASN)

REFERENCES

Stephen R. Keller, Associate Professor and Assistant Chair, Department of Plant Biology, University of Vermont
Email: stephen.keller@uvm.edu; Phone: (802) 656 5121

Matt Fitzpatrick, Associate Director for Research and Professor, Appalachian Laboratory, University of Maryland
Email: mfitzpatrick@umces.edu; Phone: (301) 689 7131

Kathryn Shallows, Restoration & Public Lands Manager, The Nature Conservancy
Email: katy.shallows@tnc.org, Phone: (860) 377 5248