

WORKSHOP ON SPECIES DISTRIBUTION MODELLING WITH MAXENT AND R

Organised by: Indian Statistical Institute, Kolkata

Venue: ISI, Kolkata

Date: 16 - 21 February, 2026

PROGRAMME SCHEDULE

Day 1: 16th Feb, 2026

9:00 – 9:30	Registration
9:30 – 11:30	Theory Session I: Species Niche and Geographic Distribution <ul style="list-style-type: none">– Workshop overview– Species niche concepts– Relationship between area and niche– BAM diagram– Niche estimation
11:30 – 11:45	Tea Break
11:45 – 1:30	Theory session II: Niche and Distribution in Practice <i>Part 1: Species occurrence data</i> <ul style="list-style-type: none">– Types of occurrence data– Bias in geographic & environmental space– Absence and pseudoabsence– Data sources <i>Part 2: Environmental data</i> <ul style="list-style-type: none">– Species-environmental relationship– Types of variables– Considerations for choosing environment data
1:30 – 2:30	Lunch break
2:30 – 4:00	Introduction to QGIS (hands on training on basic GIS operations) <ul style="list-style-type: none">– Open .csv file; export and edit shape file– Conversion of ASCII to raster and vice versa– Basic shapefile operations, convex hull, grid centroid– Extraction, adding random points
4:00 - 4:15	Tea break
4:15 – 6:00	Introduction to QGIS (continue...)

Day 2: 17th Feb, 2026

9:00 – 9:30	Interactive session: Recapitulation of topic covered
9:30 – 11:30	Working with occurrence data <ul style="list-style-type: none">– Download and processing of occurrence data from GBIF– Spatial filter of occurrence data– Model background and selection strategy
11:30 – 11:45	Tea Break
11:45 – 1:30	Working with environmental variables <ul style="list-style-type: none">– Download environmental data– Processing ASCII files– Extraction of climate and Köppen–Geiger climate layers with occurrence data– Preparation of SWD data format
1:30 – 2:30	Lunch break
2:30 – 4:00	Working with occurrence data and environmental variables (continue...)
4:00 – 4:15	Tea break
4:15 – 6:00	Working with occurrence data and environmental variables (continue...)

Day 3: 18th Feb, 2026

9:00 – 9:30	Interactive session: Recapitulation of topic covered
9:30 – 11:30	Theory session III: Niche and Distribution in Practice <i>Part 3: Modelling Ecological Niches</i> <ul style="list-style-type: none">– How MaxEnt works– MaxEnt interface <i>Part 4: Model Calibration and Evaluation</i> <ul style="list-style-type: none">– Model calibration– Selection of evaluation data– Confusion matrix– Threshold dependent and independent tests
11:30 – 11:45	Tea Break
11:45 – 1:30	Model building practical
1:30 – 2:30	Lunch break
2:30 – 4:00	Model building practical
4:00 – 4:15	Tea break
4:15 – 6:00	Model building practical

Day 4: 19th Feb, 2026

9:00 – 9:30	Interactive session: Recapitulation of major concepts
9:30 – 11:30	Introduction to R environment <ul style="list-style-type: none">– Installing Packages (<code>install.packages</code>), loading packages (<code>require</code>, <code>library</code>), <code>project</code>, <code>workspace</code>– Familiar with options (<code>setwd</code>, <code>getwd</code>, <code>sessionInfo</code>)– Data storage facilities in R (<code>c()</code>, <code>vector</code>, <code>matrix</code>, <code>data.frame</code>, <code>list</code>, <code>rep</code>, <code>numeric</code>, <code>seq</code>)– Storing of data and combining data (<code>rbind</code>, <code>cbind</code>, <code>merge</code>)– Basic plot functions (<code>plot</code>, <code>curve</code>, <code>hist</code>, <code>barplot</code>)
11:30 – 11:45	Tea Break
11:45 – 1:30	Handling Spatial Data in R <ul style="list-style-type: none">– Libraries and functions related to spatial data handling– <code>SpatialPoints</code>, <code>SpatialLines</code>, <code>SpatialPointsDataFrame</code>, <code>proj4string</code>, <code>SpatialLinesDataFrame</code>, <code>SpatialPolygons</code>, <code>crs</code> etc.– Exercises with real data
1:30 – 2:30	Lunch break
2:30 – 4:45	Handling Spatial Data in R
4:45 – 4:45	Tea break
4:45 – 6:30	Primer on Joint Species Distribution Model
6:30 – 7:30	Invited lecture by Prof. Otso Ovaskainen, University of Jyväskylä, Finland (online)
7:30 – 9:00	Workshop Dinner at ISI Guest house

Day 5: 20th Feb, 2026

9:00 – 9:30	Interactive session: Recapitulation of major concepts
9:30 – 11:30	Niche conservatism and multivariate niche visualisation
11:30 – 11:45	Tea Break
11:45 – 1:30	Running MaxEnt in R <ul style="list-style-type: none">– Loading occurrence data in R (from internet and local file)– Processing of occurrence data (<code>unique</code>, <code>subset</code>, <code>gbif</code>)– Resolving issues related to geographic bias (<code>extend</code>, <code>gridSample</code>, <code>rasterToPolygons</code>)– Loading climate data (from internet and local file)– Processing of climate data (<code>getData</code>, <code>crop</code>, <code>mask</code>, <code>writeRaster</code>)
1:30 – 2:30	Lunch
2:30 – 4:30	Running MaxEnt in R

	<ul style="list-style-type: none"> - Extraction of climate data and occurrence locations - raster::crop, brick, writeRaster, getData, mask, extract - Generating background points (gIntersection, randomPoints) - Preparation of final data for modelling - Calling MaxEnt from R - Visualization of the Results
4:30 - 4:45	Tea break
4:45 - 5:30	Feedback session
5:30 - 6:00	Valedictory session

Colour codes:

	Hands-on sessions
	Invited talks

	Theory sessions
	Breaks