

**15-day ONLINE training course on**  
**Geospatial Technology for Archaeological & Heritage Studies**  
**Archaeological Sciences Centre, IIT Gandhinagar**  
**7th-23rd Dec, 2023**

**Course Schedule**

Days	Topics	Instructors
Thurs, 7th Dec	<ul style="list-style-type: none"> <li>Introduction to the course, instructors and participants</li> <li>Introduction to GIS: Spatial data, layers, coordinate systems and data formats.</li> </ul>	V N Prabhakar
		Ekta Gupta
Fri, 8th Dec	<ul style="list-style-type: none"> <li>Hands-on training on Google Earth Pro</li> <li>Hands-on training to convert data from spatial to geospatial in QGIS: Import and export of data, and data conversion from Excel to geospatial data.</li> </ul>	Ekta Gupta
		Abhijit Ambhore
Sat, 9th Dec	<ul style="list-style-type: none"> <li>Application of GIS in Archaeology: Case studies</li> <li>Data editing and geoprocessing, including data editing, geoprocessing tools such as clipping, intersection, union, so on.</li> </ul>	Yateesh Kumar
		Haritha Kadapa
Tues, 11th Dec	<ul style="list-style-type: none"> <li>Heritage site documentation and case studies</li> <li>Hands-on training on advanced GIS techniques, including spatial data management, query building, and proximity analysis.</li> </ul>	Haritha Kadapa
		Ekta Gupta
Mon, 12th Dec	<ul style="list-style-type: none"> <li>Geospatial documentation of heritage sites beyond the protected monuments</li> <li>Mapping Archaeological Heritage in South Asia: building a geospatial database for archaeological heritage management.</li> </ul>	Kuili Suganya
		Cameron Petrie & Rebacca Roberts
Wed, 13th Dec	<ul style="list-style-type: none"> <li>Introduction to Principles of remote sensing: electromagnetic spectrum, sensors, resolution, and data acquisition techniques, concepts will be taught with examples in archaeology.</li> </ul>	M B Rajani
		Ekta Gupta
Thurs, 14th Dec	<ul style="list-style-type: none"> <li>Remote sensing data analysis: interpretation of archaeological features, crop marks, and soil marks.</li> <li>Hands-on session: Image interpretation and feature extraction.</li> </ul>	M B Rajani
		Ekta Gupta
Fri, 15th Dec	<ul style="list-style-type: none"> <li>Ancient Valabhi: A Remote Sensing Perspective</li> </ul>	Arya S Pradeep

	<ul style="list-style-type: none"> <li>• Geospatial Case Studies of Gangaikondacholapuram</li> </ul>	Shubhi Mishra
Sat, 16th Dec	<ul style="list-style-type: none"> <li>• Introduction to the significance of old maps in Archaeology.</li> <li>• Hands-on session: Map interpretation and georeferencing</li> </ul>	Ekta Gupta
		Camellia Biswas
Mon, 18th Dec	<ul style="list-style-type: none"> <li>• Seven Islands and the Fort of Bombay: A Geospatial Perspective</li> <li>• Introduction to Digital Elevation Model: concepts, sources and Challenges; Hands-on session: Data downloading and visualisation.</li> </ul>	Aishwarya
		Ekta Gupta
		Abhijit Ambhore
Tues, 19th Dec	<ul style="list-style-type: none"> <li>• Hands-on session: Hydrological modelling (watershed delineation, slope, aspect and stream network).</li> </ul>	Abhijit Ambhore
		Haritha Kadapa
		Ekta Gupta
Wed, 20th Dec	<ul style="list-style-type: none"> <li>• Landscape analysis using geo-spatially generated maps</li> <li>• Reconstructing past landscape: Remote sensing based approaches</li> </ul>	Kuili Suganya
		Ekta Gupta
Thurs, 21st Dec	<ul style="list-style-type: none"> <li>• Hands-on session: Map composition</li> <li>• Discussion of the previous exercise and assignment of another practical exercise</li> </ul>	Camellia
		Ekta Gupta
Fri, 22nd Dec	<ul style="list-style-type: none"> <li>• Conservation and management: using remote sensing and GIS for site preservation and heritage management.</li> <li>• Future trends and emerging technologies in remote sensing and GIS archaeology.</li> </ul>	M B Rajani
		Sharada C V Ekta Gupta
Sat, 23rd Dec	<ul style="list-style-type: none"> <li>• Final project presentations: Participants showcase their group projects integrating remote sensing and GIS in archaeology.</li> <li>• Discussions and conclusion</li> </ul>	V N Prabhakar Ekta Gupta Haritha Kadapa Camellia Biswas Abhijit Ambhore

## PROGRAM COORDINATORS AND RESOURCE PERSONS



**V N Prabhakar**  
*Course Coordinator*

VN Prabhakar is an Associate Professor (Archaeology) at the Indian Institute of Technology, Gandhinagar, since September 2020. He was formerly the Director (Exploration and Excavation and Institute of Archaeology) at the Archaeological Survey of India between August 2018 and September 2020. He coordinated the exploration and excavation activities throughout the country and headed the Institute of Archaeology, an academic wing of the ASI imparting education in Archaeology, Heritage Management, and Museology. He has also conducted excavations at Rupnagar (Punjab) and Karanpura (Rajasthan), both of Harappa culture, between 2011 and 2014. From 2009 to 2011, he was responsible for the exploration and excavation, conservation, and preservation of 166 nationally essential heritage structures, including the World Heritage Properties of Ajanta and Ellora Caves. He obtained his Ph.D.(2013) from the Kurukshetra University, India, on the “Burial Practices of the Harappans with Special Reference to Sanauli Excavation”. He has published around 40 research articles in journals, edited books, and conference proceedings.



**Ekta Gupta**  
*Course Co-coordinator & Resource Person*

Ekta Gupta is a Post-Doctoral Fellow at IIT Gandhinagar, Gujarat. She completed her doctoral research at the National Institute of Advanced Studies (NIAS), Bengaluru. In her doctoral thesis, she adeptly showcased how early cartographic records can significantly enhance the fields of maritime archaeology and coastal geomorphology. She holds an M.Tech in Geographic Information Systems (GIS) from NIIT University, Rajasthan, and an M.A. in geography from Savitribai Phule Pune University, Pune. Her research journey has primarily revolved around the multifaceted applications of Remote Sensing (RS) and GIS. Since 2015, her primary focus is on interdisciplinary studies that integrate knowledge, concepts and methods from early maps, archaeology, geomorphology, remote sensing, and Geographic Information Systems to understand cultural and physical landscapes. Her work not only outlined innovative methods but also expanded the potential of scrutinizing

early cartographic records to advance the understanding of maritime archaeology and coastal geomorphology. She has received a few prestigious awards and fellowships, including the Early Career Fellowship at IIT Gandhinagar in 2021 and the Nehru Trust UK Visiting fellowship.



### **Sharada C V**

#### *Resource Person*

Sharada Channarayapatna is an Assistant Professor at the Archaeological Sciences Centre in the Indian Institute of Technology, Gandhinagar, where her research focuses on scientific investigations of Dholavira's faunal and worked bone assemblage. She has found a harmonious convergence of her passions- research, nature, travel, and photography in her chosen profession- archaeology. She has garnered over 15 years of experience in reconstructing various aspects of past human-animal interactions in India and southern Europe. She is also guiding five Doctoral students whose research is on the archaeozoology of South Indian Prehistoric complexes, Bronze-Age Armenia, and Harappan Civilization sites in Haryana. Her research employs multiple proxies and methods such as spatio-temporal patterning of faunal remains for reconstructing site formation histories through GIS, statistical tools, microscopy, stable isotopes and proteomics. She has two Masters and two doctorates- awarded by Deccan College, Pune; the University of Ferrara, Italy and the National Museum of Natural History, Paris, France, respectively, specializing in Ancient Indian History, Culture and Archaeology and European Quaternary and Prehistory. Before this, she completed her BA in History, Economics and Sociology from Mysore University. She has twice received the Erasmus Mundus Scholarship and the Nehru Trust Small Study Grant for independent projects, the Indian Council of Historical Research's Junior Research Fellowship, and the DST SERB's Power grant. To date, she has published 13 articles, 3 book chapters and 2 books, besides presenting her findings at more than 25 conferences, nationally and internationally.



### **Haritha Kadapa**

*Resource Person*

Haritha is a PhD student and Graduate Teaching Fellow at the Archaeological Sciences Centre, Indian Institute of Technology Gandhinagar. Her research interests include Remote Sensing and GIS, Heritage Management, Geoarchaeology and Harappan Archaeology. Her ongoing research studies the risks of natural and anthropogenic hazards to the heritage sites of India, especially the nationally protected monuments and sites, the Indus civilization sites, and other Chalcolithic sites.



### **Abhijit Vijay Ambhore**

*Resource Person*

Abhijit Vijay Ambhore is currently pursuing a Ph.D. in Earth Science at IIT Gandhinagar, complemented by an M.Tech in Remote Sensing/GIS and a B.Tech in Computer Science. His research focuses on the synergy between Earth observation data and computational methods for sustainable development. Proficient in Google Earth Engine, Python, QGIS, and PyTorch, Abhijit is dedicated to making significant contributions to the field of environmental science. Through his Ph.D. journey, he aims to deepen our understanding of sustainable development, showcasing a unique blend of technological expertise and environmental research.



### **Camellia Biswas**

*Resource Person*

Camellia Biswas currently works as a social science research scholar in IIT Gandhinagar. Her current research is about human-nature interactions in Sundarban landscape from the lens of Political Ecology under the larger discourse of climate crisis in the era of Anthropocene. Her work involves a multimethod approach of qualitative inquiry through cartographic/GIS mapping and statistical analysis.



## INVITED SPEAKERS



### **V.P. Yathees Kumar**

Yathees Kumar currently working as an Assistant Archaeologist, Archaeological Survey of India, from July 2013. He obtained his Ph.D.(2012) from Pondicherry University, Puducherry on Archaeology of Amaravathi River Valley, Tamil Nadu. He coordinated and participated in several exploration and excavation activities throughout the country, including Adichanallur Excavation, Mahabalipuram Excavation and Pulicat Excavation. He has explored more than 625 Archaeological and Historical Sites and Monuments, including the earliest Hero stones of India at Pulimankombai and Thathapatti. He has authored several books and research articles and has been working extensively with remote sensing and GIS.



### **Kuili Suganya**

Kuili Suganya is a heritage practitioner and scholar, currently, working as a Research Associate, in MAHSA (Mapping Archaeological Heritage of South Asia) project, University of Cambridge. Her role in the project involves archaeological field exploration and training on digital field recording methods informed by geo-spatial study. Her doctoral dissertation 'Beyond the protected built heritage sites: A geospatial study of Malaprabha River Valley' had broader implications for historical and archaeological studies adopting geospatial analyses and fieldwork methods.

Her research interest is in studying the relationships between landscape elements and built environments with a focus on historical water systems. The research interest is an extension of her two decades of professional experience in heritage conservation. She has collaborated with organisations such as INTACH (a heritage NGO), Archaeological Survey of India and Infosys Foundation. Key awards include, IALA Best Dissertation Award 2022, Tata trust-NIAS Doctoral Fellowship, and Erasmus Mundus Fellowship 2007.

She is a senior partner in a non-institutional heritage initiative called 'Saythu.... Linking people and heritage' and carries out heritage-based engagements for schoolchildren, graduate and undergraduate students and young faculties.



### **Cameron Petrie**

Cameron Petrie is Professor in South Asian and Iranian Archaeology at the Department of Archaeology, University of Cambridge. He has led several large-scale international research projects, most recently as Principal Investigator of the Mapping Archaeological Heritage in South Asia (MAHSA) project. His research primarily focuses on the investigation of complex societies. He is particularly interested in the rise of complexity, the social and economic aspects of state formation, the impact that the growth of states and empires has on subjugated regions, and the relationships between humans and the environment. He has extensive field and research experience at archaeological sites dating from the Neolithic up to the medieval period in India, Pakistan and Iran.



### **Rebecca Roberts**

Rebecca Roberts is the Project Coordinator for the MAHSA project, and a Research Associate at the McDonald Institute for Archaeological Research and the Fitzwilliam Museum, University of Cambridge. Her research interests focus on the relationship between climate, subsistence strategies, and land use. Her previous experience includes the creation of bespoke cultural heritage databases and post-excavation management for developer-funded archaeology in the UK, fieldwork in Central Asia, and laboratory analysis of archaeological samples for archaeobotanical work.



### **M B Rajani**

M B Rajani is an Associate Professor at the National Institute of Advanced Studies (NIAS), Bengaluru. Her research has two inter-related facets: analysing cultural landscapes using geospatial data to identify new features of archaeological interest and advancing the usage of such analysis towards preservation of built heritage in the face of rapid urbanization. Her primary scientific contribution has been to develop a methodology for detecting tell-tale signs of past human activities on landscapes from satellite imagery and integrating these findings with other spatial data to generate new inferences and novel hypotheses about the past. Her work has therefore expanded the field of archaeology to include the study of human impact on landscapes. Her recent book *Patterns in Past Settlements* (2021) aims at imparting this knowledge to larger research and academic communities.

She is a member of Indian National Young Academy of Science 2018-2022, a Young Affiliate 2019-2023 of The World Academy of Sciences and recipient of Rachapudi Kamakshi Memorial Young Geospatial Scientist Award 2011 and P.R. Pisharoty Memorial award 2019 awarded by the Indian Society of Remote Sensing



### **Arya S Pradeep**

Arya is a conservation architect and researcher involved in the domain of cultural heritage for over five years. She is currently associated with the National Institute of Advanced Studies, Bengaluru in a multi-disciplinary research funded by the Space Applications Centre (SAC-Ahmedabad) of ISRO. Prior to this she was associated with the Indian Heritage Cities Network (IHCN-F, Bengaluru) where she was instrumental in the preparation of a nomination dossier for the inscription of the 'Monuments and Forts of Deccan Sultanates' as a UNESCO World Heritage Site and the site investigation for the Restoration and Rehabilitation of the Qanats/Karez of Bijapur in Karnataka. As a recipient of the Young Urban Designers and Architects Program (YUDAP 2020) fellowship from the French Government, she worked briefly in Paris at the Fabre-Speller Architects during which she was involved in a preliminary study and documentation of the medieval urban architecture of Marignane city in France. Apart from this she was involved in the research, mapping, architectural documentation, assessment of condition and architectural photography of several historical and cultural sites such as Agra, Delhi, Hampi, Nainital, Bidar, Bijapur, Gulbarga and central parts of Kerala in India and Paris, Avignon and Marignane in France.

Her current research work focuses on the geo-spatial analysis of Cultural Landscapes involving four major geographical regions of the sub-continent which includes the Gangetic Delta, Saurashtra, Krishna-Godavari delta and Thar. This involves paleo-topographical reconstruction of cultural landscapes using GIS and Remote Sensing. She is also interested in Cultural Anthropology, Historiography, Coastal Geomorphology, Maritime Trade and Heritage, Buddhist sites of the Indian sub-continent and illustration, particularly satirical cartoons.





### **Shubhi Mishra**

Shubhi Mishra worked as Project Associate at NIAS (National Institute of Advance Studies, Bangalore) on the Project “Cultural Landscape Research; Characterising and managing built heritage” funded by ISRO. She conducted landscape survey of UNESCO World Heritage sites by analysing remote sensing data, Digital Elevation Models (DEM), Corona Imagery, LISS-3 and 4, along with other raster data. She Did PGDA from Institute of Archaeology, Archaeology Survey of India and M.A in AIHC & Archaeology from Banaras Hindu University. She was involved in exploration and excavations in Barnawa, Uttar Pradesh; Raighard, Maharashtra; and Telhara, Bihar.



### **Aishwarya Mhaske**

Ms. Aishwarya is currently pursuing her PhD in the Heritage Science and Society Programme in the School of Humanities at NIAS. She worked as Project Associate – I on the Project “Exploring Medieval Coastline using Geospatial Analysis and Historical Records at NIAS. Before NIAS, Ms. Aishwarya worked as a Researcher for Varaha Tech Labs, Delhi, and the Archaeological Survey of India Jodhpur Circle. Ms. Aishwarya’s research interest lies in analysing imprints of Heritage using Geospatial Analysis. She is also interested in Settlement Archaeology, Environmental Archaeology and Landscape Archaeology. She has participated in Archaeological excavations and explorations. Ms. Aishwarya has her M.Phil. and her Master’s Degree is in Ancient Indian History Culture and Archaeology from Deccan College, PGRI, Pune.