iSiM 2021
International Symposium on
IoT and ML for
Ecosystem Restoration &
Multihazard Resilience
05th to 09th of June 2021

www.amrita.edu/isim2021
EVENTS

**Keynote Sessions**
Ground-Breaking Insights by Academic and Industry Leaders

**Ph.D. Colloquium**
Interdisciplinary Colloquium by Doctoral Students

**Poster Presentations**
Bachelors and Masters Students, Ph.D. Scholars and Faculty Members

**Panel Discussions**
Challenges & technologies on Symposium Themes

**Technical Hackathon**
Solve Problems Related to Ecosystem Restoration

**Technical Workshops**
Hands-on Training in IoT, ML & GIS Technologies in Real-World Settings

THEMATIC AREAS

**Theme 1**
Emerging Technologies for Ecosystem Restoration

**Theme 2**
Impact of Climate Change on Ecosystem & Multi Hazards

**Theme 3**
IoT and ML for Managing Ecosystem & Multi Hazards

**Theme 4**
Climate Change Adaptation Techniques & Community Resilience

**Theme 5**
Case Studies for Ecosystems Restoration & Multi-Hazard Resilience
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>02:00 - 02:03 pm</td>
<td>Introduction</td>
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<td>02:03 - 02:05 pm</td>
<td>Prayer</td>
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| 02:05 - 02:10 pm | **Welcome Address**  
Dr. Maneesha Vinodini Ramesh,  
Dean, School for Sustainable Development & International Programs;  
UNESCO Chair on Experiential Learning for Sustainable Innovation & Development; Professor & Director, Amrita Center for Wireless Networks & Applications, Amrita Vishwa Vidyapeetham, India |
| 02:10 - 02:20 pm | **Introduction to Amrita Sustainability Initiatives**  
Video Presentation |
| 02:20 - 02:35 pm | **Inaugural Address by Chief Guest of Honour**  
Shri. K. Rajan,  
Minister, Land Revenue, Survey and Land Records, Land Reforms, Housing, State of Kerala, India |
| 02:35 - 02:55 pm | **Keynote Address by Guest of Honour**: Ecosystem Restoration & Multihazard Resilience: Challenges & Opportunities  
Dr. V. Thiruppugazh, IAS,  
Additional Secretary (Policy and Plan), National Disaster Management Authority (NDMA), Government of India |
| 02:55 - 03:05 pm | **Guest of Honor**  
Mr. Eric Falt,  
Director and UNESCO Representative to Bhutan, India, Maldives and Sri Lanka |
| 03:05 - 03:15 pm | **Guest of Honor**  
Mr. Agendra Kumar,  
Managing Director, ESRI, India |
| 03:15 - 03:25 pm | **Guest of Honor**  
Swami Atmananda Puri,  
In-Charge, Mata Amritanandamayi Math, Australia & New Zealand |
| 03:25 - 03:30 pm | **Vote of Thanks**  
Dr. Balakrishnan Shankar,  
Dean, Faculty of Humanities & Social Sciences, Professor & Associate Dean, School of Engineering, Amritapuri, Amrita Vishwa Vidyapeetham, India |

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<tr>
<th>Time</th>
<th>Activity</th>
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<tr>
<td>03:30 - 03:45 pm</td>
<td>Break</td>
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<tr>
<td>Time</td>
<td>Session</td>
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| 3:45 - 4:15 pm | **Keynote Talk 1** - Dr. Saibal Ghosh, Director, Landslide Studies Division, Geohazard Research & Management (GHRM) Centre, Geological Survey of India  
Creation and updation of national geoscientific information for use in geohazard research and management - A core activity by Geological Survey of India |
| 4:15 - 4:45 pm | **Keynote Talk 2** - Dr. Samir Kumar Adhikari, Chief, National Health Emergency Operation Center, Joint Spokesperson and Multi-sector Coordination Chief, Ministry of Health and Population, Government of Nepal  
Impact of Climate Change on Ecosystems and Multi-hazards: Challenges and Approaches |
| 4:45 - 5:15 pm | **Keynote Talk 3** - Prof. Bruce Malamud, Professor, Natural and Environmental Hazards, Department of Geography, King's College, UK  
Multi-hazard Interrelationship Scenarios |
| 5:15 - 5:45 pm | **Keynote Talk 4** - Prof. A. C. Narayana, Professor, Centre for Earth, Ocean and Atmospheric Sciences, University of Hyderabad, India  
Imminent Climate Change and Response of Ecosystems and Natural hazards: Challenges Ahead |
| 5:45 - 5:50 pm | Discussions / Break |
| 5:50 - 6:05 pm | **Keynote Talk 5** - Dr. Tarek Rasheed, VP of Civilizology LLC, International Consultant with UNDP and FAO, and Adjunct Professor, Department of Social Work, Amrita Vishwa Vidyapeetham, India  
Modeling Adaptive Capacity and Resilience of Socio-Ecological Systems |
| 6:05 - 6:30 pm | **Keynote Talk 6** - Dr. Sreevalsa Kolathayar, Assistant Professor, National Institute of Technology, Karnataka, India  
Disaster Geotechnics - Geotechnical Engineering in Disaster Risk Reduction |
| 6:30 - 6:45 pm | **Keynote Talk 7** - Dr. Sudesh Wadhawan, Advisor [Geosciences] and Adjunct Professor, Amrita Vishwa Vidyapeetham; Director General [ret’d.], Geological Survey of India  
Integrated Strategies for Conservation of Geodiversity and Biodiversity-Implications for Restoring Ecosystem in Western Thar Desert, India |
| 6:45 - 7:00 pm | **Keynote Talk 8** - Dr. Geetha Srikanth, Assistant Professor, Computational Engineering and Networking, Amrita Vishwa Vidyapeetham, India  
Geospatial Technology in Disaster Management |
| 7:00 - 7:30 pm | **Keynote Talk 9** - Dr. Susheela Devi Visweswariah, Principal Research Scientist, Indian Institute of Science, India  
Benefits and applications of predictive ecology modeling |
| 07:30 - 07:35 pm | Discussions / Break |
| 7:35 - 7:55 pm | **Keynote Talk 10** - Mr. Vikas Brahnavar, Director, Transwater Systems, India  
Urban - Ecosystem Revival with Waste Water Recovery |
| 7:55 - 8:15 pm | **Keynote Talk 11** - Mr. Ganesh Shankar, Founder & CEO, FluxGen, India  
IoT and Data Science for Cleantech Industry |
<table>
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<th>Time</th>
<th>Title</th>
<th>Speaker</th>
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<tr>
<td>8:15 - 8:45 pm</td>
<td><strong>Keynote Talk 12</strong> - Catalysing international partnerships for Ecosystem Restoration and Sustainable Tourism</td>
<td>Dr. Albert Chiang, Scientist-C (Restoration Ecology), Animal &amp; Plant Resources Department, Institute of Bioresources and Sustainable Development, Government of India</td>
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<tr>
<td>8:45 - 9:15 pm</td>
<td><strong>Keynote Talk 13</strong> - New and Established Emerging Technologies to the Rescue: A Global Overview of Sustainable/Good Governance with Machine Learning/AI and Open Access</td>
<td>Dr. Falk Huettmann, Associate Professor, Wildlife Ecology, University of Alaska, USA</td>
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<tr>
<td>9:15 - 9:30 pm</td>
<td><strong>Keynote Talk 14</strong> - New and Established Emerging Technologies to the Rescue: A Global Overview of Sustainable/Good Governance with Machine Learning/AI and Open Access</td>
<td>Dr. Anupam Joshi, Senior Environment Specialist, Environment, Natural Resources and Blue Economy Practice, World Bank, India</td>
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<td>9:30 - 10:00 pm</td>
<td><strong>Keynote Talk 15</strong> - Frameworks for Improving Monitoring and Prediction of Hydro-Climate Extremes</td>
<td>Dr. Alireza Farahmand, Science Data Engineer, JPL, NASA; Adjunct Faculty, Department of Geography, California State University Los Angeles, USA</td>
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**THEME 2 & 3**

Day 2 - June 06, 2021
10:00 am - 10:00 pm IST

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<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>10:00 - 10:30 am</td>
<td><strong>Poster Presentations</strong></td>
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<td>10:30 - 11:30 am</td>
<td><strong>Ph.D. Colloquium</strong></td>
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<td>11:30 am - 12:30 pm</td>
<td><strong>Lunch Break</strong></td>
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<td>12:30 - 12:45 pm</td>
<td><strong>Keynote Talk 16</strong> - AI based early warning signals for rate dependent transitions in Ecosystems</td>
<td>Dr. E. A. Gopalakrishnan, Assistant Professor, Computational Engineering and Networking, Mechanical Engineering, School of Engineering, Amrita Vishwa Vidyapeetham, India</td>
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<tr>
<td>12:45 - 01:00 pm</td>
<td><strong>Keynote Talk 17</strong> - Ecosystem Restoration by community participation</td>
<td>Dr. Maya Mahajan, Associate Professor, Centre for Sustainable Future, Amrita Vishwa Vidyapeetham, India</td>
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<td>01:00 - 01:15 pm</td>
<td><strong>Keynote Talk 18</strong> - Evolution of flash drought and vegetation resilience: a remote sensing based analysis</td>
<td>Dr. Alka Singh, Assistant Professor, Amrita Center for Wireless Networks &amp; Applications, Amrita Vishwa Vidyapeetham, India</td>
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<tr>
<td>01:15 - 01:30 pm</td>
<td><strong>Keynote Talk 19</strong> - Conservation agriculture: a climate change resilient practice and its compliance and performance in small holding rice farming unit</td>
<td>Dr. Sudheesh Manalil, Head of Research, Chairperson &amp; Professor, School of Agricultural Sciences, Amrita Vishwa Vidyapeetham, India</td>
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<td>01:30 - 01:45 pm</td>
<td><strong>Keynote Talk 20</strong> - Use of genetic algorithm in rainfall threshold modelling for landslide early warning systems</td>
<td>Dr. Dhanya M., Assistant Professor, Amrita Center for Wireless Networks and Applications (AmritaWNA), Department of Physics, Amrita Vishwa Vidyapeetham, India</td>
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<tr>
<td>01:45 - 02:00 pm</td>
<td><strong>Discussions / Break</strong></td>
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Keynote Talk 21 - Dr. D. Vasudevan, General Manager and Head, Information Systems, Varanasi Smart City Limited, India
IoT Integration with GIS in Smart Cities as Latest Technology trend

Keynote Talk 22 - Mr. Chethan Seegehalli, Head Digitalization and Technology Solutions and Solution Engineering, Siemens Advanta, India
Role of Emerging Technologies in Building Sustainable Ecosystem

Keynote Talk 23 - Prof. Pascal Perez, Director, SMART Infrastructure Facility, University of Wollongong, Australia
FloodAware: An Integrated and Real Time Flood Management System using IOT and ML

Keynote Talk 24 - Prof. Rajiv Ranjan, Distinguished Professor and Academic Director, School of Computing, Newcastle University, UK
Osmotic Computing: A New IoT Application Programming Paradigm for Smart Cities

Keynote Talk 25 - Dr. Mauro Rossi, Researcher, Istituto di Ricerca per la Protezione Idrogeologica (IRPI), Consiglio Nazionale delle Ricerche (CNR), Italy
LAND-SUITE a set of tools for landslide susceptibility zonation

Keynote Talk 26 - Dr. Maneesha V . Ramesh, Dean, School for Sustainable Development & International Programs; UNESCO Chair on Experiential Learning for Sustainable Innovation & Development; Professor & Director, Amrita Center for Wireless Networks & Applications, Amrita Vishwa Vidyapeetham, India
IoT Systems Integrated with ML Techniques for Ecosystem Monitoring & Community based Disaster Resilience

Panel Discussion 1 - Impact of Climate Change on Ecosystem and Multi hazard : Challenges and Technologies
Chair: Dr. Joost Monks
Members: Dr. Nicola Casagli, Mr. Virupakshappa Hovale, Mr. Soichiro Yasukawa, Dr. K.R Viswanathan, Dr. Karthik Sankaranarayan, Dr. Sudesh Wadhawan, Dr. Matjaz Mikos, Dr. A A Virajh Dias

Keynote Talk 27 - Dr. Dilip Krishnaswamy, Vice President, New Technology Initiatives, Reliance Jio Platforms Ltd, India
Distributed Edge Microservices-based IoT and ML platforms for Managing Ecosystem and Multi Hazards

Keynote Talk 28 - Mr. Virupakshappa Hovale, Country General Manager, Bosch Rexroth, India
IoT and Machine Learning as an enabler for sustainability

Keynote Talk 29 - Mr. Jayaraj Rajapandian, Director of Engineering, Smart City, Honeywell, India
Title

Keynote Talk 30- Prof. David G Toll, Professor, Department of Engineering, Durham University, UK
Resilience of Transportation Infrastructure to Climate Impacts
Keynote Talk 31 - Dr. Muhammad Imran, Senior Scientist, Qatar Computing Research Institute, Hamad Bin Khalifa University, Qatar
How AI is Transforming Disaster Response

Keynote Talk 32 - Mr. Ravi Teja Chilukuri, Chief Technology Office, Sentienz, India
The crucial partnership - IoT with Bigdata

Keynote Talk 33 - Prof. Dr. Kostas Nikolopoulos, Professor, Business Information Systems & Analytics, Durham University, UK
We need to talk about intermittent demand forecasting

THEME 4 & 5

Day 3 - June 07, 2021
10:00 am - 10:00 pm IST

10:00 - 10:40 am Poster Presentations

10:40 - 11:00 am Keynote Talk 34 - Dr. K. R. Viswanathan, Landslip – Lead Investigator
Innovative climate adaptation approaches and technologies towards strengthening of community resilience and promoting gender balanced development

11:00 - 11:30 am Ph.D. Colloquium

11:30 am - 12:30 pm Lunch Break

12:30 - 1:00 pm Keynote Talk 35 - Prof. David Demeritt, Professor of Geography, King's College London, UK
Title

01:00 - 01:30 pm Keynote Talk 36 - Mr. Vijay Prasad Kesari, Project Management Officer, UNDP Pacific Office, Fiji
Climate Change Adaptation Techniques & Community Resilience: Similarities and Difference in Mountainous Country and Small Islands Developing States

01:30 - 02:00 pm Discussions / Break

02:00 - 02:30 pm Keynote Talk 37 - Prof. Sethuraman Rao, Associate Professor, Amrita Center for Wireless Networks and Applications (AmritaWNA), Amrita Vishwa Vidyapeetham, India
Community Resilience through Horizontal Linkages in the Age of Mobile Internet

02:30 - 03:00 pm Keynote Talk 38 - Dr. Jonathan Chambers, BGS Geophysical Tomography Team Leader, BGS Keyworth, UK
Title

03:00 - 03:30 pm Keynote Talk 39 - Dr. Hari Srinivasan, Coordinator, Global Development Research Centre Professor of Environmental Policy and Sustainability, Graduate School of Policy Studies, Kwansei Gakuin University, Japan
Innovative climate adaptation approaches and technologies towards strengthening of community resilience and promoting gender balanced development

03:00 - 03:30 pm Keynote Talk 40 - Dr. Maria J Santos, Professor, Earth System Science, University of Zurich, Switzerland
Ecosystem service resilience in global delta systems
03:30 - 04:00 pm  **Keynote Talk 41** - Dr. Robert Tiong Lee Kong, Associate Professor, School of Civil & Environmental Engineering, Nanyang Technological University, Singapore
Climate Change Actions

04:00 - 04:15 pm  **Discussions / Break**

04:15 - 04:45 pm  **Keynote Talk 42** - Prof. Davide Geneletti, Associate Professor, Department of Civil, Environmental and Mechanical Engineering, University Of Trento, Italy
Nature-based solutions for urban sustainability

04:45 - 05:15 pm  **Keynote Talk 43** - Dr. Nambi Appadurai, Director, Climate Resilience Practice, World Resources Institute, UK
Title

05:15 - 05:45 pm  **Keynote Talk 44** - Prof. Anand Patwardhan, Professor, School of Public Policy, University of Maryland, USA
What constitutes “success” in adaptation?

05:45 - 05:50 pm  **Discussions / Break**

05:50 - 06:10 pm  **Keynote Talk 45** - Dr. Debapriya Dutta, Head & Scientist “G”/Adviser-Mission Societal-Science for Equity Empowerment and Development(SEED), Department of Science & Technology, Government of India
Climate Change and Community Resilience

06:10 - 07:30 pm  **Panel Discussion 2 - Ecosystem Restoration & Community Resilience : Challenges And Way Forward**
**Chair:** Prof. Vinod Chandra Menon
**Members:** Mr. Vijay Prasad Kesari, Dr. Nava Subramaniam, Dr. Dharam Uprety, Dr. Maneesha Vinodini Ramesh, Dr. Veronica Tofani, Dr. Faith Taylor, Dr. Debapriya Dutta, Dr. Gretchen C. Coffman

07:30 - 07:45 pm  **Discussions / Break**

07:45 - 08:15 pm  **Keynote Talk 46** - Dr. Ramesh Sivanpillai, Research Scientist, Wyoming GIS Center, University of Wyoming, USA
Multi-satellite remotely sensed data for tracking major environmental disasters

08:15 - 08:35 pm  **Keynote Talk 47** - Mr.Sudhir Dembi, General Manager, Schneider Automation, India
Title

08:35 - 08:45 pm  **Poster Presentations**

08:45 - 09:15 pm  **Keynote Talk 48** - Dr. Ivan Marchesini, Researcher, Istituto di Ricerca per la Protezione Idrogeologica (IRPI), Consiglio Nazionale delle Ricerche (CNR), Italy
Data-driven flood hazard zonation. An application to Italy

09:15 - 09:45 pm  **Keynote Talk 49** - Prof. Michele Calvello, Associate Professor, Geotechnical Engineering, University of Salerno, Italy
Landslide risk community governance and resilience

09:45 - 10:00 pm  **Keynote Talk 50** - Dr. Viswanathan P. K., Professor, Department of Management, Amrita Vishwa Vidyapeetham, India
Will Incentivising Farmers Help Eco-restoration? The case of Royalty payments for Protection of Paddy Wetlands in Kerala
<table>
<thead>
<tr>
<th><strong>Workshop 1</strong></th>
<th><strong>Introduction to Python Programming</strong></th>
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<tr>
<td>10:00 am - 11:30 am</td>
<td>Introduction to Python - Basics</td>
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<td>11:00 am - 11:05 am</td>
<td>Break</td>
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<tr>
<td>11:05 am - 12:00 pm</td>
<td>Introduction to GitHub</td>
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<tr>
<td>12:00 pm - 01:00 pm</td>
<td>Basic Python Programming</td>
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<td>01:00 pm - 02:00 pm</td>
<td>Lunch Break</td>
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<tr>
<td>02:00 pm - 03:30 pm</td>
<td>Advanced Python Programming</td>
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<tr>
<th><strong>Workshop 2</strong></th>
<th><strong>Getting started with IoT</strong></th>
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<tr>
<td>03:30 pm - 04:00 pm</td>
<td>Green Economy &amp; IOT in Lighting &amp; relevance to smart building work spaces for future.</td>
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<tr>
<td>04:00 pm - 04:45 pm</td>
<td>Single Board Computers, Microprocessors and Simulation Platforms</td>
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<td>04:45 pm - 05:00 pm</td>
<td>Discussion &amp; Q&amp;A</td>
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<td>05:00 pm - 05:15 pm</td>
<td>Break</td>
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<tr>
<td>05:15 pm - 06:45 pm</td>
<td>Demo: Industrial IoT Applications &amp; Visualisation</td>
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<td>06:45 pm - 06:50 pm</td>
<td>Break</td>
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<tr>
<td>06:50 pm - 08:00 pm</td>
<td>Demo on IoT Platform</td>
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| 08:00 - 08:15 pm | Discussions / Break |
An Introduction to Machine Learning

10:00 am - 10:30 am  Introduction to Machine Learning: types of ML algorithms, need and applications
10:30 am - 10:45 am  Break
10:45 am - 11:30 am  ML Algorithm: Introduction to Linear regression (theory)
11:30 am - 11:40 am  Break / Discussion
11:40 am - 12:10 pm  Hand-on demo and explanation of Linear Regression using scikit learn
12:10 pm - 01:00 pm  Hands-on student implementing Linear Regression
01:00 pm - 02:00 pm  Lunch Break
02.00 pm - 02:30 pm  Talk on Geospatial Modeling
02:30 pm - 02:45 pm  Q&A
02.45 pm - 03:30 pm  Introduction to Classification problems and using Support Vector Machines (SVM)
03.30 pm - 03:40 pm  Break / Discussion
03.40 pm - 04:30 pm  Hand-on demo and explanation of SVM code using scikit learn
04.30 pm - 05:00 pm  Overview of Datascience Applications

An Introduction to Geospatial Technology

05:00 pm - 05:40 pm  Geospatial applications overview with ESRI tools
• Smart Mapping  • Analysis  • Sharing and Collaboration
05:40 pm - 06:30 pm  Hands-on Exercise: Site a new hospital - Find possible locations for a new hospital based on spatial criteria
06:30 pm - 06:45 pm  Break / Discussion
06:45 pm - 07:15 pm  Sharing GIS Content Using ArcGIS Online
Create apps from maps:  • Building a web application using Experience Builder  • Scripting Using Arcade  • Story Maps
07:15 pm - 08:00 pm  Hands-on Exercise: Building a web application using Experience Builder and Scripting Using Arcade
08:00 pm - 08:35 pm  Demonstration of Multi-criteria analysis using Geoplanner / Suitability Modeler
08:35 pm - 08:45 pm  Q/A Session