

# Integration of fundamental principles and applications of emerging techniques in urban forestry

Drs. Nancai PEI, Cheng WANG, et al.

Chinese Academy of Forestry  
Urban Forest Research Center, National Forestry and  
Grassland Administration of China





# Outline

- **A brief history on urban forestry**
- **A conceptual framework for modern urban forestry**
- **Emerging techniques in modern urban forestry**
- **China's urban forestry: theory and practice**



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# A brief history on urban forestry (Northern America)

- **Canada:**

- **The term "urban forestry" was initially coined by Professor Erik Jorgensen at the University of Toronto in 1965.**
- **“A specialized branch of forestry to cultivate and manage trees and forests for their present and potential contributions to the psychological, sociological and economic well-being of urban society.”——Erik Jorgensen, in 1970.**

- **United States:**

- **Researchers identified and prioritized three themes: urban forest resource, resource management, and a community framework.**



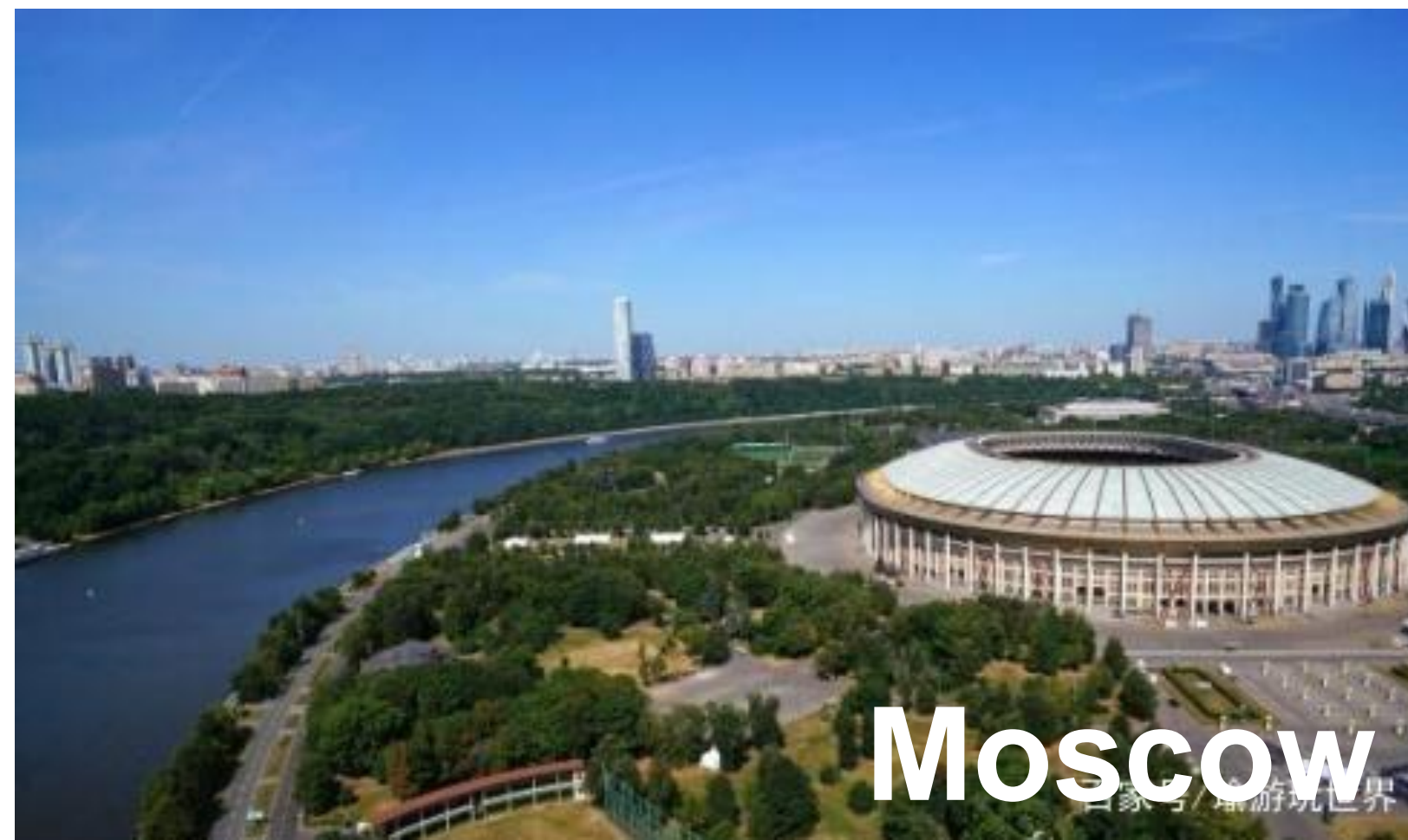
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# A brief history on urban forestry (Europe)

- **United Kingdom**
- **Germany**
- **Russia**



London's Green Spaces



Moscow



Freiburg



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# A brief history on urban forestry (Asia)

- **India**

- old urban parks in Bangalore city with larger trees and greater species diversity can provide much more environmental benefits and ecosystem services





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# A brief history on urban forestry (Asia)

## • China

- China has been one of the pioneers implementing research and practical application of urban forestry, particularly in several highly dense mega-cities (e.g., Beijing, Shanghai, Guangzhou, Hongkong).





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# A brief history on urban forestry (Southern America)

- **Brazil**

➤ In some Brazilian cities, the wealthier neighborhoods in public spaces, socioeconomic and education levels of the population can positively affect tree diversity and urban sustainability.



# A conceptual framework for modern urban forestry

- Based on classical forestry principles

forestry dimension, referring to intrinsic properties of woody species, and management of forest community.

- Assisted by landscape principles

landscape dimension, relating to planning and design of urban forests and greenings

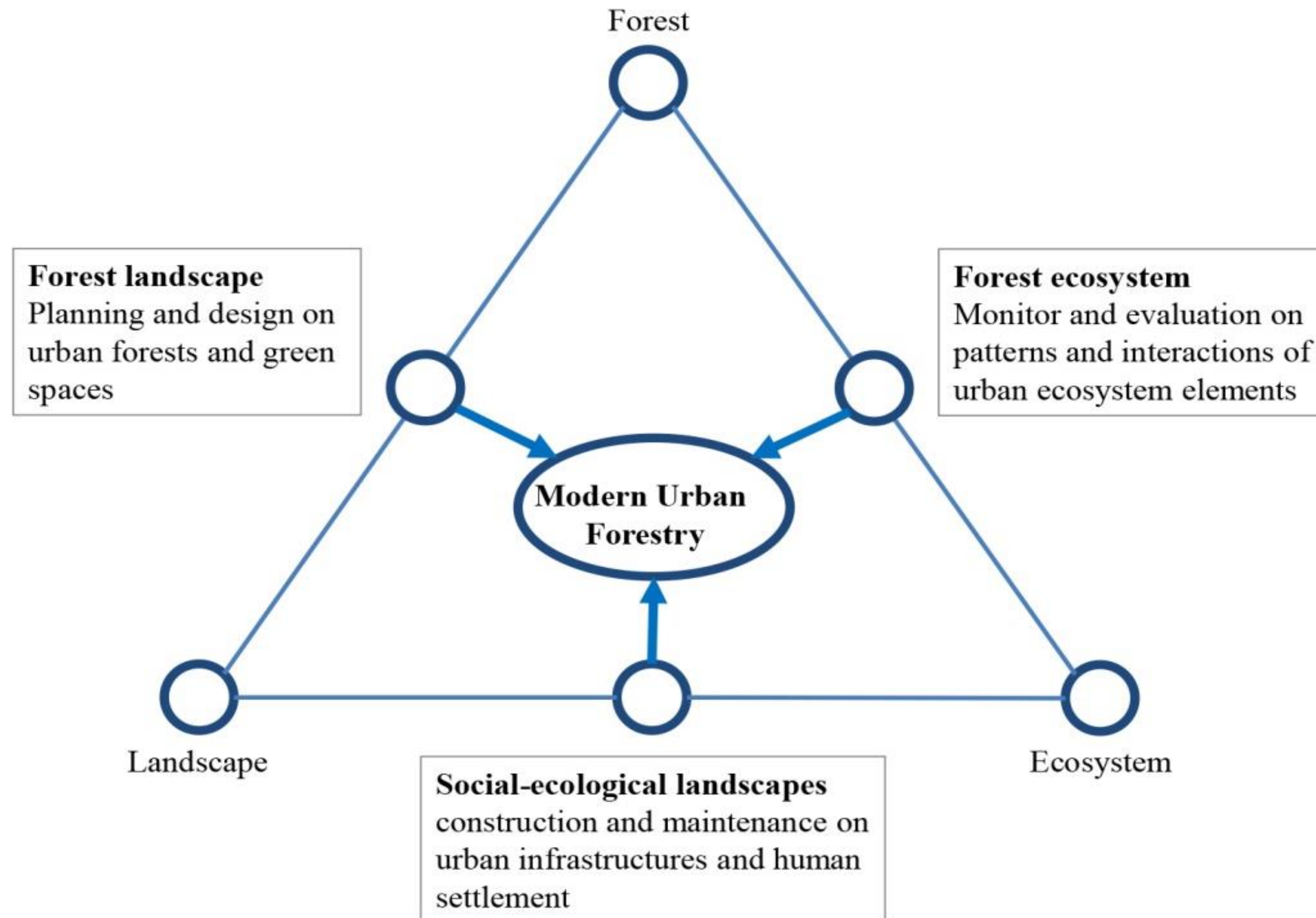
- Aimed at achieving better ecosystem services

ecosystem dimension, involving functions and sustainability of urban forests.





# Forest-Landscape-Ecosystem scheme





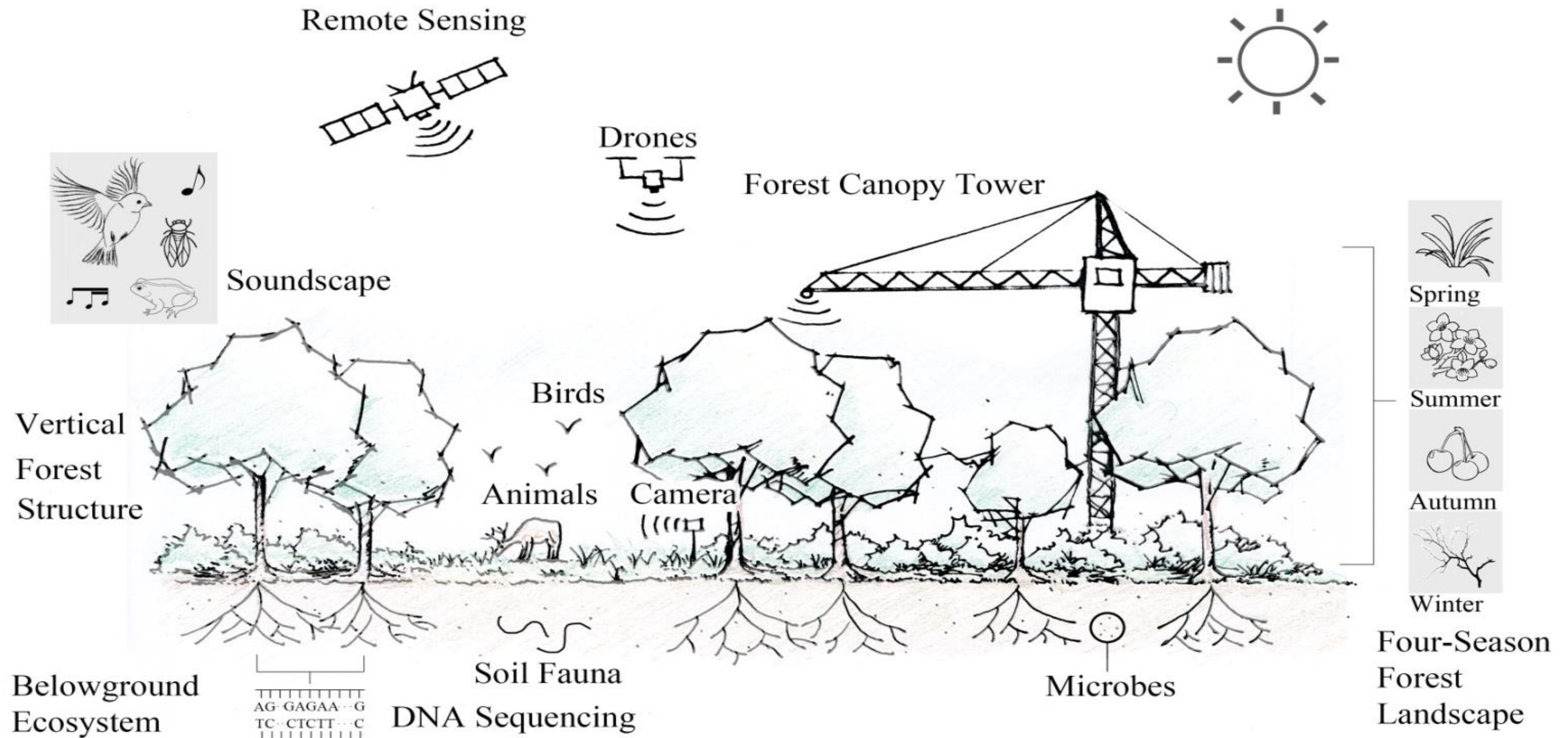
# Emerging techniques in modern urban forestry

- **A “two-pronged” pathway**
- **Spatial-level techniques** (SLTs) include, but are not limited to, forest canopy and high-altitude, understory, and belowground categories.
- **Organism-level techniques** (OLTs) involve micro-, meso-, and macro- components of forests.



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# A schematic representation of emerging techniques





# Three fundamental principles related to modern urban forestry

	Crucial Rationales	Essential Variables
<b>Principles of Forestry</b>	<p>Silviculture: Sustainable strategy, mixed and multifunctional forest management.</p> <p>Afforestation: Close-to-nature concept, matching site with trees.</p>	<p>Plant life-history strategies;</p> <p>Forest structure and succession</p>
<b>Principles of Landscape Planning and Design</b>	<p>Learning from nature.</p> <p>Ensure healthy life and beautiful sight, and promote well-being for all people.</p>	<p>Aesthetics,</p> <p>Concordance,</p> <p>Livability,</p> <p>Sustainability</p>
<b>Ecological Theory Systems</b>	<p>Function of the whole ecosystem is greater than the sum of the parts (1+1&gt;2).</p> <p>Form a community of shared life encompassing all living things.</p>	<p>Adaptability,</p> <p>Diversity,</p> <p>Productivity,</p> <p>Resilience,</p> <p>Stability</p>



# Take-home message

- Long-term afforestation efforts are supposed to gradually optimize landscape pattern and living space, improve eco-environmental quality, and increase regional biodiversity.
- A conceptual framework, integrating theories/principles from forestry, landscape and ecosystem dimensions, is essential for the development of modern urban forestry in a new era of rapid urbanization.
- Innovative techniques at spatial-level and organism-level are effective to drive researches on biodiversity, ecosystem, landscape, etc.

# Acknowledgments

- Thank you for your attention!
- Funding:
  - **Special Fund for Forest Scientific Research in the Public Welfare** (No. 201404301)
  - **NSF-China** (No. 31570594)
- International Collaborators:
  - **Dr. & Prof. Cecil C. Konijnendijk**, University of British Columbia
  - **Dr. & Prof. W. John Kress**, Smithsonian Institution