

Current Topics in the Geographic Information Science & Technology Body of Knowledge

Data Management (DM)		Analytics & Modeling (AM)	
<u>Spatial Databases</u>	<u>Query Processing</u>	<u>Methodological Context</u>	<u>Analysis of Errors & Uncertainty</u>
Spatial Database Mngmnt Systems <i>Relational DBMS and Extensions</i> <i>Geodatabases</i> <i>Topological Relationships</i> <i>Database Administration</i>	<i>Optimal I/O Algorithms</i> <i>Spatial Joins</i> <i>Complex Queries</i>	Geospatial Analysis & Model Building Evolution of Reasoning, Analytics	Conceptual Models of Error/Uncertainty Spatial Data Uncertainty Problems of Scale & Zoning Thematic Accuracy and Assessment Mathematical Models of Uncertainty
Conceptual Data Models Logical Data Models Physical Data Models Array Databases NoSQL databases Problems w/ Large Spatial Databases	<u>Georeferencing Systems</u> Linear Referencing Earth's Shape, Sea Level, Geoid Geographic Coordinate Systems Planar Coordinate Systems <i>U.S. National Grid</i> Vertical (Geopotential) Datums Horizontal (Geometric) Datums	<u>Building Blocks</u> Overlay <i>Areal Interpolation</i> Aggregation of Spatial Entities Grid Operations & Map Algebra Classification & Clustering <i>Boundaries & Zone Membership</i> Spatial Queries Buffering	Big Data & Geospatial Analysis Problems of Large Spatial Databases Pattern Recognition and Matching Artificial Intelligence Approaches Intro to Spatial Data Mining Rule Learning for Spatial Data Mining Machine Learning Approaches Cyberinfrastructure
<u>Representation of Spatial Objects</u> Raster Data Models Hexagonal Models TIN Models Hierarchical Data Models Topological Models Vector Data Models Network Models Entity-based Models Modeling 3-D Entities Fields in Space and Time Fuzzy Models Events and Processes Genealogical Relationships, Lineage Geospatial Data Conflation	<u>Data Manipulation</u> Point, Line, Area Generalization Vector-to-Raster and R-to-V Conversions Raster Resampling Coordinate Transformations Transaction Management	<u>Data Exploration & Spatial Stats</u> Spatial Statistics Spatial Sampling for Spatial Analysis Exploratory Spatial Data Analysis Point Pattern Analysis Kernels & Density Estimation Spatial Interaction Cartographic Modeling Multi-Criteria Evaluation Landscape Metrics Hot-spot and Cluster Analysis Global Measures of Spatial Association Local Indicators Spatial Autocorrelation Simple Regression & Trend Surfaces Geographically Weighted Regression Spatially Autoregressive Models Spatial Filtering Models	<u>Surface & Field Analysis</u> Modeling Surfaces <i>Gridding, Interpolation, & Contouring</i> <i>Inverse Distance Weighting</i> <i>Radial Basis and Spline Functions</i> <i>Polynomial Functions</i> Kriging Interpolation <i>LiDAR Point Cloud Analysis</i> Intervisibility, Line-of-Sight, Viewsheds <i>DEM and Terrain Metrics</i> <i>TIN-based models and Terrain Metrics</i> Watersheds and Drainage <i>3D Parametric Surfaces</i>
<u>Spatial Access Methods</u> Spatial Data Retrieval Strategies Spatial Indexing Space-driven Structures Data-driven structures Modeling Unstructured Spatial Data Modeling Semi-structured Spatial Data	<u>Data Standards & Infrastructures</u> Metadata, Quality, and Uncertainty Geospatial Content Standards Spatial Data Warehouses Spatial Data Infrastructures U.S. National Spatial Data Infrastructure Ontology for Geosptl Semantic Interop. <i>Historic Geospatial Data Standards</i> Marine Spatial Data Infrastructures	Network & Location Analysis <i>Intro to Network & Location Analysis</i> <i>Network Route & Tour Problems</i> Location & Service Area Problems Accessibility Modeling Location-Allocation Modeling The Classic Transportation Problem	Geocomputation Methods/Models Cellular Automata Agent-based Modeling Simulation Modeling <i>Artificial Neural Networks</i> Genetic Algorithms / Evolutionary Cmptng Space-Time Analytics & Modeling Time Geography Capturing Spatiotemporal Dynamics GIS-based Computational Modeling Computational Movement Analysis <i>Volumes and Space-Time Volumes</i>
Cartography & Visualization (CV)	<u>Map Design Techniques</u>	Domain Applications (DA) (continued)	
<u>History & Trends</u>	Cartography & Science Cartography & Art Cartography & Power	Real Estate Recreation Planning & Management Retail Businesses State & Regional Government <i>Telecommunications</i>	Urban & Regional Planning <i>Utilities</i> <i>Water Resources</i> <i>Wildlife & Fisheries Science</i>
<u>Data Considerations</u>	Common Thematic Map Types Multivariate Mapping Spatio-Temporal Representation Representing Uncertainty Terrain Representation Cartograms		
<u>Map Design Fundamentals</u>	Map Icon Design <i>Narrative & Storytelling</i> Flow Maps Collaborative Cartography		
<u>Map Production & Management</u>	<u>Interactive Design Techniques</u> User Interface & User Experience (UI/UX) Web Mapping Virtual & Immersive Environments Big Data Visualization Mobile Maps & Responsive Design Usability Engineering & Evaluation		
<u>Map Use</u>	Map Reading Map Interpretation Map Analysis Lesson Design in Cartography Education		
	Geovisual Analytics Geovisualization		

GIS&T Body of Knowledge
3/31/2022
bold = revised & expanded
regular = original & still limited
italics = future or forthcoming
<https://gistbok.ucgis.org>