

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

GIS&T Body of Knowledge
12/31/2021
bold = revised & expanded
 regular = original & still limited
italics = future or forthcoming
<https://gistbok.ucgis.org>