JAMES SCOTT CARDINAL

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Experienced project manager, research scientist, and analyst with 20+ years' record of technical innovation and team leadership. Specialized in exploratory and experimental analytics for complex and unstructured data. Expertise in identifying and formalizing the structuring principles of data-generating processes, deriving quantitative metrics for qualitative assessments, and transforming data into narratives.

PROFESSIONAL EXPERIENCE

New York State Museum, Albany NY

Sr. Project Director, Museum Scientist	2008-Present
Project Director, Education Program Assistant	2004-2008
Assistant Project Director, Education Specialist	1999-2004

Regulatory consultant for State and Federal management of cultural resources and heritage

- Pioneered the application of GIS in program area to identify spatial patterns in field data, now standard departmental procedure, reducing analysis and reporting times by 80%
- Developed spatial auto-correlation method to locate significant locations, reducing subjectivity in delineating resources for risk mitigation or avoidance using Local Indicators of Spatial Association (LISA) as threshold
- Derived quantitative metrics in R for scoring resource integrity and significance using weighted co-expression network analysis, minimizing subjectivity in assessment and recommendations
- Designed and implemented research strategies to detect culturally significant resources, assessed potential project risks and impacts, and recommended mitigation strategies to inter-agency and public stakeholders
- Directed cross-functional research teams, coordinating the efforts of 5-25+ staff members and outside contractors
- Upgraded and normalized databases and created UI for integrating field data, collections records, and analytical features for projects
- Initiated analytics pipelines to combine spatial and tabular data for exploratory data analysis, descriptive analytics, and statistical inference that promoted empirically rigorous and data-driven recommendations and reporting
- Authored 50+ research reports documenting the identification, analysis, and mitigation for 20+ National Register of Historic Places archaeological sites

EDUCATION

Master of Science in Analytics
2021 Georgia Institute of Technology, Atlanta, GA.

Master of Arts in Anthropology
2011 University at Albany (State University of New York), Albany, NY.

PROFESSIONAL STRENGTHS

Project Management	Probability & Statistics	Bayesian Statistics
Team Leadership	Machine Learning	Statistical Inference
Technical Communication	Data Visualization	Social Networks Analysis
Research Design	Graph Analytics	Regression Modeling
Data Science	Geo-Spatial Analysis	Cluster Analysis

SKILLS & TOOLS

Programming: Python, R, MATLAB/Octave, SQL, VBA
Tools: Linux, Jupyter, LaTeX, Git, VS Code, R Studio
Libraries: NumPy, SciPy, Pandas, Scikit-Learn, NLTK, SpaCy, Huggingface transformers, NetworkX, Tidyverse, Matplotlib, ggplot, igraph
Productivity: MS Office, Adobe Creative Suite, ESRI ArcMap, QGIS

ANALYTICS PROJECTS

Bipartite Graph Association & Spatial Community Detection

- Applied two-mode graph analysis to the associations between geo-spatial locations and artifact types to identify spatially clustered assemblages

Social Media Discourse Analysis

- Applied natural language processing, functional linguistics, and belief network analysis to evaluate psychometric indicators of discourse styles in political speech
- Analyzed collection of 15,000 tweets to learn patterns of sentiment and stance to identify distinct communities and potential instances of misinformation influences

COVID-19 Research Abstract Topic Modeling and Query

- Applied topic modeling and semantic network detection of COVID-19 research abstracts to create a searchable knowledge graph dashboard
- Analyzed 300,000 article abstracts related to COVID-19 research to classify networks of related research domains

HONORS & AWARDS

Executive Vice President for Research Award: 2020 Career, Research, and Innovation Development Conference (CRIDC), Georgia Institute of Technology, best graduate student poster presentation

RECENT PUBLICATIONS

"Similarity Measures and Graph Adjacency with Sets." Towards Data Science, October 28, 2022

"Bipartite Graphs for Archaeological Assemblage Networks." Towards Data Science, September 22, 2022

"Use, Purpose, and Function: Letting the Artifacts Speak." Heritage 3(3), 2020: 587-605

- Defined empirical correlates of human material behavior, 3,300+ article views and 3,000+ downloads

"Sets, Graphs, and Things We Can See: A Formal Combinatorial Ontology for Empirical Intra-Site Analysis." Journal of Computer Applications in Archaeology 2(1), 2019: 56-78

- Applied set and graph theory to spatio-temporal distribution of artifacts, 1,000+ article views and 130+ downloads, 3 citations

RECENT CONFERENCE PAPERS

"Objectives and Information: Mutual information, composite probabilities, and partitioning of archaeological sets." Computer Applications and Quantitative Methods in Archaeology (CAA) 48th international conference. Limassol, Cyprus (virtual). June 2021.

"Point and Line to Hyperplane: Set and Graph Theory for Parsing Systemic Contexts and Assemblages." Computer Applications and Quantitative Methods in Archaeology (CAA) 47th international conference. Kraków, Poland. April 2019.

"Matrix in the Network: Assemblage co-expression networks to unlock meaning in stratigraphic matrices." Computer Applications and Quantitative Methods in Archaeology (CAA) 46th international conference. Tübingen, Germany. March 2018.

"Unscrambling the Egg: Quantitative, assemblage-based component consociation methods for densely mixed or disturbed contexts." Computer Applications and Quantitative Methods in Archaeology (CAA) 45th international conference. Atlanta, Georgia. April 2017.