

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.