

**Education**

**Ph.D. Geography**, 2012. University of California, Santa Barbara.

- Focus on GIScience, Hazards, Transportation, Modeling and Simulation
- Dissertation: *Modeling Evacuation Vulnerability*

**M.A. Geography**, 2009. University of California, Santa Barbara.

- Focus on GIScience, Electoral Geography, Modeling and Simulation
- Thesis: *Remapping the Presidency: The Impact of Redistricting under the California Presidential Election Reform Act*

**B.S. Geography**, 2000. University of Minnesota, Twin Cities.

- Focus on GIS, Demographic Mapping

**Publications**

**Brachman, M. L.** and R.L. Church. (2018). Optimizing Safe Routes to School. *Socio-Economic Planning Sciences*. <https://doi.org/10.1016/j.seps.2018.08.003>

Roberts, J.D., M. Hu, B. I. Saksvig, **M.L. Brachman**, C.P. Durand. (2018). Examining the influence of a new light rail line on the health of a demographically diverse and understudied population within the Washington, DC metropolitan area: A protocol for a natural experiment study. *International Journal of Environmental Research and Public Health*. 15(2):333. <https://doi.org/10.3390/ijerph15020333>

**Brachman, M. L.** (editor). (2016). OGC GeoPackage Elevation Extension Engineering Report. [OGC 16-094r3]

**Brachman, M. L.** and S. Dragicevic. (2014). A spatially explicit network science model for emergency evacuations in an urban context. *Computers, Environment and Urban Systems*, Volume 44, pages 15-26. <https://doi.org/10.1016/j.compenvurbsys.2013.10.009>

Church, R.L., J. Shynk, **M.L. Brachman**, C. Baez. (2014). First Responder Support Systems Testbed (FiRST): Cross Cutting Cooperative Systems for Emergency Management. Geotrans Laboratory, UCSB, Santa Barbara, CA.

**Brachman, M. L.** and B. Adams. (2010). Theoretical Framework for a Mobile Emergency Decision Support and Routing Application. *Proceedings, 6th International Symposium on Geoinformation for Disaster Management*. Torino, Italy.

**Brachman, M. L.** and R. L. Church. (2009). Planning for disaster: a review of the literature with a focus on transportation related issues (FiRST report), Geotrans Laboratory, UCSB, Santa Barbara, CA.

Niblett, M. R., **M. L. Brachman**, H. Rapolho, R. Church (eds). (2008). *Proceedings, ISOLDE XI: Eleventh International Symposium on Locational Decisions*. Santa Barbara, CA.

**Brachman, M. L.** (2008). Dynamic Cartogram Visualization of Presidential Election Results. *Proceedings, AutoCarto*. Shepherdstown, WV.

## **Funding**

**Title:** Purple Line Outcomes on Transportation (PLOT) Study: An Examination of Pre-Purple Line Active Transportation Behaviors and Attitudes among Prince George's County Residents

**Role:** Co-Investigator (PI: J.D. Roberts)

**Award:** \$49,902

**Funding Source:** University of Maryland College Park Faculty Incentive Program

**Funding Period:** 8/1/2017 – 1/31/2019

**Title:** Luce Environmental Science to Solutions Fellowship

**Role:** Fellow

**Funding Source:** California Institute for Hazards Research

**Award:** \$6,000

**Funding Period:** 9/1/2010 – 8/30/2013

**Title:** Evacuation Behavior During the Jesusita Fire

**Role:** Principle Investigator

**Funding Source:** University of California, Santa Barbara Institute for Social, Behavioral and Economic Research

**Award:** \$2,64

**Funding Period:** 6/1/2010 – 5/30/2011

## **Experience**

**Lecturer**, 2017 - present. Center for Geospatial Information Science, Department of Geographical Sciences, University of Maryland, College Park.

- Developed course syllabi, lecture materials, labs, quizzes, and exams for both in-person and online courses for the Master of Professional Studies in Geospatial Intelligence Program.
- Delivered lectures and labs covering a breadth of topics related to Geospatial Intelligence (GEOINT) including GIS, remote sensing, spatial analysis, spatial data models and data quality, network flow modeling and transportation microsimulation, and professional development.
- Courses developed and taught: Fundamentals of Geospatial Intelligence, GEOINT Systems and Platforms, Hazards and Emergency Management, GEOINT Networks
- Courses in development: Open Source Intelligence.

**Geospatial Scientist**, 2015-2017. Strategic Alliance Consulting, Alexandria, VA.

- Served as a GIScience and geospatial technology subject matter expert as a contractor supporting the Army Geospatial Center and the National Geospatial Intelligence Agency.
- Supervised an interdisciplinary team from academia, government, and industry to address significant real-world problems related to geospatial intelligence and security including appropriate use of Coordinate Reference Systems and the development and implementation of geospatial data standards.
- Developed a custom training program covering intelligence gathering, geospatial analytics, and data architectures for dissemination of GEOINT products to support tactical and strategic objectives.
- Taught and mentored a diverse group of full-time government employees and Pathways student interns
- Participated on a senior management team overseeing a portfolio of geospatial projects including standards compliance testing, software capabilities development and code integration, technical architectures for cross-platform geospatial data dissemination, and development of geospatial requirements.

**Systems Engineer**, 2014-2015. Reinventing Geospatial, Fairfax, VA.

- Served as a GIScience and geospatial technology subject matter expert as a contractor supporting the Army Geospatial Center.
- Worked with an interdisciplinary team to address significant real-world problems related to geospatial intelligence and security and to support the development of custom geospatial analytic and visualization software.
- Developed a monthly lecture series to bridge the knowledge gap between computer scientists and GEOINT professionals
- Compiled analytical summaries formulated policy recommendations and proposed solutions to geospatial problems related to the Army Geospatial Enterprise.

**Instructor**, 2013. Department of Geography, Vancouver Island University, Nanaimo, BC.

- Developed course syllabi, lecture materials, quizzes, and exams for both in-person and online courses for the post-graduate level Advanced Diploma in GIS Applications Program.
- Delivered daily lectures covering a breadth of topics related to GIS and Spatial Analysis, including spatial data models and data quality, network flow modeling and transportation microsimulation, spatial analysis and geostatistics, and professional development.
- Courses taught: Introduction to Geographic Information Systems, General Spatial Analysis

**Post-Doctoral Fellow**, 2013. Spatial Analysis and Modeling Lab, Simon Fraser University Burnaby, BC

- Conducted applied GIScience research on transportation network performance and population vulnerabilities and resiliencies for an emergency evacuation scenario in Burnaby, British Columbia.
- Developed network flow data analysis and spatial statistical models in R and developed multi-modal transportation microsimulation using PTV Vision Suite.
- Produced custom Internet-based geospatial visualizations using Flash, HTML5, and Javascript.

**Research Assistant**, 2008-2012. First Responder System Testbed, UCSB Santa Barbara, CA

- Built an interdisciplinary team from academia, government, and industry to address significant real-world problems related to hazards with a focus on emergency evacuation preparedness and planning.
- Conducted applied GIScience research using statistics, modeling, visualization, and other geospatial analytics for emergency evacuations from wildfires, radiological incidents, hurricanes, and tsunamis.
- Conducted on-line survey to obtain empirical data on transportation issues associated with the 2009 Jesusita Fire emergency evacuation in Santa Barbara.
- Developed custom transportation network flow models using LINGO and R, and developed custom transportation microsimulations using PTV Vision Suite.
- Developed custom spatial analytics using Visual Basic, Matlab, and Python.
- Performed mapping and spatial analysis with ArcGIS, QGIS, ENVI, and IMAGINE.

**Instructor**, 2010. Department of Geography, UCSB, Santa Barbara, CA.

- Developed course syllabi, lecture materials, quizzes, and exams.
- Delivered daily lectures covering a breadth of topics related to GIS and Spatial Analysis, Cartography, Navigation, Remote Sensing, GPS, Hazards, and Electoral Geography.
- Course taught: Maps and Mapping.

**Teaching Assistant**, 2006 - 2007. Department of Geography, UCSB, Santa Barbara, CA.

- Geography 115A: The Earth From Above.
- Geography 115B: Intermediate Remote Sensing.
- Geography 115C: Remote Sensing and Digital Image Processing.
- Geography 3B: Land Surface Processes.
- Geography 135: Climate Summit.

**GIS Technician**, 2006. Great Lakes WATER Institute, University of Wisconsin, Milwaukee, WI.

- Developed custom ESRI Geodatabase solution to analyze and manage aerial photo dataset
- Used remote sensing technology to support manual and automated imagery exploitation, feature extraction, and spectral analysis.
- Implemented a GIS data management strategy, and developed numerous visualizations and cartographic representations of data.

**Conservation Intern**, 2005 - 2006. Ecology Group at Bandelier National Monument, National Park Service, Los Alamos, NM.

- Conducted fieldwork and data collection using GPS to support joint National Park Service/USGS research projects.
- Developed data model to store collected field data, and build custom user interface for data entry.
- Created custom ESRI application to perform spatial analyses on collected data.

**GIS Specialist**, 2000 - 2005. Metropolitan Area Research Corporation, Minneapolis, MN.

- Produced residential maps, jurisdictional boundaries maps, congressional districts maps, demographic maps, residential maps, commercial maps quantitative/qualitative thematic maps, and interactive map products to describe demographic and land use trends for metropolitan areas and provide policy recommendations.
- Collected and analyzed data to support research on US metropolitan areas.
- Managed geospatial databases and performed GIS analyses.

## **Presentations**

Optimizing Safe Routes to Schools. *Makeover Montgomery 4*. May 2018, Silver Spring, MD.

The Geo-Atom for GEOINT. *2018 GEOINT Symposium Lightning Talk*. April 2018, Tampa, FL.

Tactical Urbanism. *Center for Geospatial Information Science Geography Awareness Week Lightning Talks*. November 2017, College Park, MD. (Invited Talk)

Towards a Universal 3D CRS. *100th OGC Technical Committee Meeting*. September 2016, Orlando, FL.

GeoPackage Conformance Testing and Extension Development. *100th OGC Technical Committee Meeting*. September 2016, Orlando, FL.

GeoPackage Elevation Extension Interoperability Experiment. *98th OGC Technical Committee Meeting*. March 2016, Washington, DC.

Modeling the Evacuation Decision. *2nd International Conference on Evacuation Modeling and Management*. August 2012, Evanston, IL.

Tsunami Evacuation Route Accessibility in Thailand. *Association of American Geographers Annual Meeting*. February 2012, New York, NY.

Internships and Work-Based Learning. *Association of American Geographers Annual Meeting*. February 2012, New York, NY. (Panelist)

Modeling Evacuation Routes: A Wildfire Case Study. *National Evacuation Conference*. February 2012, New Orleans, LA.

Evacuation Lessons from Hurricane Irene. *Miller-McCune Curious and Curiouser Podcast with Jai Ranganathan*. August 2011, Santa Barbara, CA. (Interview)

Modeling Evacuation Vulnerability: A Research Framework. *Conference for the International Federation of Operational Research Societies*. July 2011, Melbourne, Australia.

Optimizing Safe Routes to Schools. *Association of American Geographers Annual Meeting*. April 2011, Seattle, WA.

Modeling Evacuation Vulnerability during a Radiological Emergency. *PTV Vision 11th Annual North American Users Group Meeting*. April 2010, Seattle, WA

Hurricane Katrina: Communication and Transportation Failures. *Association of American Geographers Annual Meeting*. March 2009, Las Vegas, NV.

Remapping the Presidency: The Impact of Redistricting under the California Presidential Election Reform Act. *Association of American Geographers Annual Meeting*. April 2008, Boston, MA

Remapping the Presidency: The Impact of Redistricting under the California Presidential Election Reform Act. *The Geography of the Election: A graduate student discussion hosted by spatial@ucsb*. February 2008, Santa Barbara, CA. (Invited Talk)

### **Published Maps**

Sperling, J. (2004). *The Great Divide: Retro vs. Metro America*, PoliPoint Press.

Orfield, M. (2002). *American Metropolitics: The New Suburban Reality*, Brookings Institution Press.

**Awards**

Jack and Laura Dangermond Travel Scholarship, 2007-2012. *Department of Geography, University of California, Santa Barbara.*

Luce Environmental Science to Solutions Fellowship, 2010. *California Institute for Hazards Research.*

Graduate Research Award for Social Science Surveys, 2010. *Institute for Social, Behavioral and Economic Research, University of California, Santa Barbara.*

Best Abstract Award, 2010. *PTV Vision 11th Annual North American Users Group Meeting.*

Best Senior Project, 2000. *Department of Geography, University of Minnesota, Twin Cities.*

**Outreach and Community Service**

Co-Chair, 2018 – present. *Rock Creek Palisades Community Association Traffic Calming Committee, Kensington, MD.*

Volunteer, 2015 - present. *Potomac Appalachian Trail Club, Fairfax, VA.*

Volunteer, 2015 - present. *American Association of Geographers GeoMentors Program, Washington, DC*

Volunteer, 2013. *Yaletown House, Vancouver, BC.*

Volunteer, 2009 - 2011. *American Red Cross, Santa Barbara Chapter.*

Invited Presentation, 2011. "From an Image to a Map", *Santa Barbara High School AP Human Geography Class.*

Guest Lecture, 2011. "Human Dimensions of Environmental Hazards." *Geography 3B: Land, Water, and Life, UCSB*

Guest Lecture, 2009. "Electoral Geography." *Geography 5: People, Place, and Environment, UCSB*

Guest Lecture, 2008. "Classical Decision Making for Uncertainty." *Geography 185B: Decision Analysis, UCSB*

Presentation, 2008. "Hurricane Katrina." *Laguna Blanca School, Santa Barbara, CA.*

**Affiliations**

*United States Geospatial Intelligence Foundation*

*American Association of Geographers*

*National Council for Geographic Education*

*Potomac Appalachian Trail Club*

*Washington Area Bicyclist Association*