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github.com/paulojraposo
gis.stackexchange.com/users/40481/paulo-raposo
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Curriculum Vitæ

2025-02-16

Employment

Assistant Professor (Universitair Docent) of Geovisualization, Department of Geo-information Processing (GIP), Faculty of Geo-Information Science and Earth Observation (ITC), The University of Twente. September 1st, 2019 to present.

Assistant Professor of Geographic Information Science, Department of Geography, The University of Tennessee, Knoxville. August 15th, 2016 to July 31st, 2019. Tenure-Track.

Education

Ph.D., August 13*th* 2016, Geography, Department of Geography, The Pennsylvania State University. Specialization in Cartography. *Multiscale Raster Treatments for Map Generalization*. Advised by Prof. Cynthia A. Brewer.

MS, August 13*th* 2011, Geography, Department of Geography, The Pennsylvania State University. Specialization in Cartography. *Scale-Specific Automated Map Line Simplification by Vertex Clustering on a Hexagonal Tessellation*. Advised by Prof. Cynthia A. Brewer.

Honours B.Sc. With High Distinction, June 19*th* 2008, Archaeological Science, Department of Anthropology, with GIS Minor, Department of Geography and Program in Planning, University of Toronto.

Programming & Computing

Proficient in Python, JavaScript, PHP, and Java programming languages: data visualization, cartography, spatial computing, web and app development, image analysis.

Proficient with GIS, Linux, graphical, and analysis software packages, libraries, and APIs: ArcGIS, QGIS, D3, R, GDAL, Cesium, NASA WorldWind, Anaconda, matplotlib, numpy, networkx, MySQL, LaTeX.

Additional Languages

Basic Dutch, French, and Portuguese.

Publications

Refereed Journal Articles

Marçal Russo, L., Dane, G., Helbich, M., Ligtenberg, A., Filomena, G., Janssen, C. P., Koeva, M., Nourian, P., Patuano, A., Raposo, P., Thompson, K., Yang, S., and Verstegen, J. A. (2025). Do Urban Digital Twins Need Agents? *Environment and Planning B: Urban Analytics and City Science*. https://doi.org/10.1177/23998083251317666.

Lehtola, V. V., Koeva, M., Elberink, S. O., Raposo, P., Virtanen, J.-P., Vahdatikhaki, F., and Borsci, S. (2022). Digital Twin of a City: Review of Technology Serving City Needs. *International Journal of Applied Earth Observation and Geoinformation.* https://doi.org/10.1016/j.jag.2022.102915.

Mocnik, F. B., Raposo, P., Feringa, W., Kraak, M. J., and Köbben, B. (2020). Epidemics and Pandemics in Maps - The Case of COVID-19. *Journal of Maps*, 16(1), 144-152. https://doi.org/10.1080/17445647.2020.1776646.

Raposo, P., Touya, G., and Bereuter, P. (2020). A Change of Theme: The Role of Generalization in Thematic Mapping. *International Journal of Geo-Information*, 9(6), 371. https://www.mdpi.com/2220-9964/9/6/371/htm.

Raposo, P. (2020). Variable DEM Generalization Using Local Entropy for Terrain Representation Through Scale. *The International Journal of Cartography*, 6(1), 99–120. https://doi.org/10.1080/23729333.2019.1687973.

Raposo, P., Robinson, A., and Brown, R. (2019). A Virtual Globe Using a Discrete Global Grid System to Illustrate the Modifiable Areal Unit Problem. *Cartographica*, 54(1), 51–62. https://doi.org/10.3138/cart.54.1.2018-0015.

Raposo, P., Brewer, C. A., and Sparks, Kevin. (2016). An Impressionistic Cartographic Solution for Base Map Land Cover with Coarse Pixel Data. *Cartographic Perspectives*, 83, 5–21. https://doi.org/10.14714/CP83.1351.

Raposo, P. and Brewer, C. A. (2014). Landscape Preference and Map Readability in Design Evaluation of Topographic Maps with an Orthoimage Background. *The Cartographic Journal*, 51(1), 25–37. https://doi.org/10.1179/1743277412Y.0000000027.

Raposo, P. (2013). Scale-Specific Automated Line Simplification by Vertex Clustering on a Hexagonal Tessellation. *Cartography and Geographic Information Science*, 40(5), 427–443. https://doi.org/10.1080/15230406.2013.803707.

Khan, K., Memish, Z. A., Chabbra, A., Liauw, J., Hu, W., Janes, D. A., Sears, J., Arino, J., Macdonald, M., Calderon, F., Raposo, P., Heidebrecht, C., Wang, J., Chan, A., Brownstein, J., and Gardam, M. (2010). Global Public Health Implications of a Mass Gathering in Mecca, Saudi Arabia During the Midst of an Influenza Pandemic. *Journal of Travel Medicine*, 17(2), 75–81. https://doi.org/10.1111/j.1708-8305.2010.00397.x.

Khan, K., Arino, J., Hu, W., Raposo, P., Sears, J., Calderon, F., Heidebrecht, C., Macdonald, M., Liauw, J., Chan, A., and Gardam, M. (2009). Spread of a Novel Influenza A (H1N1) Virus Via Global Airline Transportation. *New England Journal of Medicine*. July 9, 361(2), 212–214. https://www.nejm.org/doi/pdf/10.1056/NEJMc0904559.

Weyman, J. T., Raposo, P. J., Cannata, R., Oh, J., Motz, M., Gozdyra, P., Booth, G. L., and Glazier, R. H. (2008). Urban Environments and Walkability: Definition and Calculation of a Walkability Index for Toronto, Canada. *Canadian Journal of Diabetes*, *32*(4), 320–320. https://www.canadianjournalofdiabetes.com/article/S1499-2671(08)24090-6/pdf.

Edited Book Sections

Raposo, P. (2017) Scale & Generalization. The Geographic Information Science & Technology Body of Knowledge. (4th Quarter 2017 Edition) John P. Wilson (Ed.). doi: 10.22224/gistbok/2017.4.3. http://gistbok.ucgis.org/bok-topics/scale-and-generalization-1

Raposo, P. (2016). Geomorphological Delineation using Computer Vision to Support Automated Mapping. In H. Onsrud and W. Kuhn (Eds.), *Advancing Geographic Information Science* (pp. 313–318). Needham, MA, USA: GSDI Association Press.

Nittel, S., Bodum, L., Clarke, K. C., Gould, M., Raposo, P., Sharma, J., and Vasardani, M. (2016). Emerging Technological Trends Likely to Affect GIScience in the Next Twenty Years. In H. Onsrud & W. Kuhn (Eds.), *Advancing Geographic Information Science* (pp. 45–59). Needham, MA, USA: GSDI Association Press.

Invited Presentations

Raposo, P. (April 20th, 2023). Flow Maps, QTM, and XR Globes. Presented to The Netherlands eScience Center, Amsterdam.

Raposo, P. (January 19th, 2023). "Brown bag" lunch presentation to the Laboratory of Geo-information Science and Remote Sensing (Laboratorium voor Geo-informatiekunde en Remote Sensing), Wageningen University, the Netherlands. Invited by Professor Alexander K.A.J. Klippel.

Raposo, P. (November 17th, 2022). Flow Maps and QTM Generator. Presented at The Netherlands eScience Center Mini Symposium on Sustainable Research Software Development for Geo-Information Science and Earth Observation, held at the Faculty ITC, The University of Twente, Enschede, The Netherlands.

Raposo, P. (May 27th, 2019). Contemporary Geovisualization and My Prospective Role at ITC. Presented to the Department of Geo-information Processing, ITC, The University of Twente, Enschede, The Netherlands.

Raposo, P. (February 25th, 2019). Generalizing and Enhancing Geographic Structure for Cartographic Visualization, or, "Seeing a Pattern Here." Presented to the Department of Geography, University of Connecticut, Storrs, Connecticut.

Raposo, P. (January 22nd, 2018). Generalizing and Enhancing Geographic Structure for Cartographic Visualization, or, "Seeing a Pattern Here." Presented to the Department of Geography, McGill University, Montreal, Canada.

Raposo, P. (2016). Geomorphological Delineation using Computer Vision to Support Automated Mapping. Presented at the Vespucci Institute, Bar Harbor, Maine.

Raposo, P. (February, 2016). Landscape Dataset Enhancement and Generalization - Terrain and Land Cover. Presented to the Department of Geography, The University of Tennessee, Knoxville.

Raposo, P. (June 4th, 2015). Landscape Dataset Enhancement and Generalization - Terrain and Land Cover. Presented to the Geographic Information Science and Technology (GIST) research group at Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Editorials

Touya, G., Bereuter, P. and Raposo, P. (2020). Editorial for Special Issue: "A New Generation for Map Generalisation." *International Journal of Cartography*. 6(1), 1–3. https://doi.org/10.1080/23729333.2020.1718914.

Refereed Proceedings, Papers

* *Denotes Raposo was presenter.*

Raposo, P., and Robinson, A. (2016). *Representing Spatio-Temporal Events Across Scales*. In Proceedings of Understanding Spatial Data (Big and Small) with Visual Analytics (SpatialVA2016), workshop at GIScience 2016. Montreal, Canada.

Stanislawski, L. V., Buttenfield, B. P., Raposo, P., Cameron, M., and Falgout, J. (2015). *Synoptic Evaluation of Scale-Dependent Metrics for Hydrographic Line Feature Geometry*. Paper presented at the 18th ICA Workshop on Generalisation and Multiple Representation, Rio de Janeiro, Brazil.

Raposo, P. (2015). *Geomorphological Delineation Using Computer Vision to Support Automated Mapping*. The Vespucci Institute 2015, Week 2: Advancing Geographic Information Science: The Past and Next Twenty Years, Bar Harbour, Maine, USA. *

Raposo, P., and Samsonov, T. (2014). *Towards General Theory of Raster Data Generalization*. The 17th International Cartographic Association (ICA) Workshop on Generalisation and Multiple Representation, Vienna, Austria.
https://kartographie.geo.tu-dresden.de/downloads/ica-gen/workshop2014/genemr2014_submission_13.pdf *

Raposo, P., Brewer, C. A., and Stanislawski, L. V. (2013). *Label and Attribute-Based Topographic Point Thinning*. The 16th ICA Workshop on Generalisation and Multiple Representation, Dresden, Germany. *

Stanislawski, L. V., Raposo, P., Howard, M. and Buttenfield, B. P. (2012). *Automated Metric Assessment of Line Simplification in Humid Landscapes*. AutoCarto, Columbus, Ohio. *

Brewer, C. A., Stanislawski, L. V., Buttenfield, B. P., Raposo, P., Sparks, K. A. and Howard, M. (2012). *Multiscale Design for The National Map of the United States: Road Thinning for Topographic Mapping*. AutoCarto, Columbus, Ohio.

Raposo, P., and Brewer, C. A. (2011). *Comparison of Topographic Map Designs for Overlay on Orthoimage Backgrounds*. The 25th International Cartographic Conference, Paris, France. *

Raposo, P. (2010). *Piece by Piece: A Method of Cartographic Line Generalization Using Regular Hexagonal Tessellation*. The ASPRS/CaGIS 2010 Fall Specialty Conference (AutoCarto), Orlando, Florida. *

Refereed Proceedings, Abstracts

* *Denotes Raposo was presenter.*

Fish, C., Raposo, P., Guidero, E. M., and Roth, R. E. (2023, August 18). Research Approaches in Cartography: A Preliminary Review. Proceedings of the 2023 International Cartographic Conference. ICC 2023, Cape Town, South Africa. https://doi.org/10.5194/ica-abs-6-63-2023.

Lange, V., and Raposo, P. (2022). *MapColPal — A color palette generation and testing tool for thematic maps*. Proceedings of EuroCarto2022. EuroCarto, Vienna, Austria. https://doi.org/10.5194/ica-abs-5-153-2022.

Listabarth, J., and Raposo, P. (2022, April 22). *Automated polygon schematization for thematic maps*. Proceedings of the 3rd Schematic Mapping Workshop. The Schematic Mapping Workshop 2022. Ruhr University, Bochum, Germany. https://www.ruhr-uni-bochum.de/schematicmapping/papers/smw-listabarth-raposo.pdf.

Raposo, P., and Kraak, M.-J. (2021, December 16). *Design strategies for airline route maps, learning from the past*. Proceedings of the 2021 International Cartographic Conference. ICC 2021, Firenze, Italy; and online. https://doi.org/10.5194/ica-abs-2-47-2020. *

Kraak, M.-J., and Raposo, P. (2020, September 25). *Design strategies for airline route maps, learning from the past*. Proceedings of the EuroCarto 2020 Conference. EuroCarto 2020, Vienna, Austria; and online. https://www.abstr-int-cartogr-assoc.net/2/47/2020/ica-abs-2-47-2020.pdf

Raposo, P. (2019). *Geovisualization of complex origin-destination flow maps using Discrete Global Grid Systems*. Abstracts of the International Cartographic Association. International Cartographic Conference, Tokyo, Japan. *

Colen, M. and Raposo, P. (2019). *Morphological Measurements Compared to Human Landscape Preference*. In Proceedings of the University Consortium for Geographic Information Science (UCGIS) 2019 Symposium on The Geospatial Humanities. Washington, D.C.

Washington-Allen, R., Raposo, P., Ribeiro, N. S., Friedrichs, R., Banze, A. A., & Vermilyea, C. W. (2018). *Use of Virtual and Augmented Reality Technologies to Inventory Miombo Woodland Carbon Stocks in Support of REDD*. In Proceedings of the Ecological Society of America (ESA) Annual Meeting. New Orleans, Louisiana.

Washington-Allen, R., Raposo, P., Ribeiro, N., Vermilyea, C. W., Friedricks, R., & Landolt, K. (2018). *Application of Virtual Reality Technologies in Support of REDD Related Woodland Inventories*. In Proceedings of the 71st Society For Range Management Annual Meeting. Sparks, Nevada.

Raposo, P. (2017). *Adaptive Multi-Scale DEM Smoothing Using Local Entropy*. In Proceedings of the International Cartographic Conference. Washington, D.C. *

Raposo, P., and Brewer, C. A. (2013). *Automated Attribute Enrichment for Automated Multiscale Maps*. Paper presented at The 26th International Cartographic Conference, Dresden, Germany. *

Raposo, P., and Brewer, C. A. (2013). *Guidelines for Consistently Readable Topographic Vectors and Labels With Toggling Backgrounds*. The 26th International Cartographic Conference, Dresden, Germany. *

Brewer, C.A., Guidero, E.M., Stanislawski, L.V., Buttenfield, B.P., & Raposo, P. (2013). *Labeling Through Scale Using Hierarchies of Thinned Road Networks for Design of The National Map of the United States*. The 26th International Cartographic Conference, Dresden, Germany.

Brewer, C. A., Guidero, E. M., & Raposo, P. (2013). *Road Thinning Through Scale for* The National Map *of the United States*. Given online via Webex, International Cartographic Association (ICA) and European Spatial Data Research (EuroSDR) National Mapping Association Symposium, Barcelona, Spain.

Raposo, P., and Brewer, C. A. *Comparison of topographic map designs for overlay on orthoimage backgrounds*. The 1st National Map Users Conference (USGS), May 2011, Denver, Colorado; and The USGS Center of Excellence for Geospatial Information Science (CEGIS) All-Hands Meeting, 2011, Rolla, Missouri. *

Other Presentations

* *Denotes Raposo was presenter.*

Raposo, P. and Schouwenburg, M. (July 5th, 2023). *Earth Globes in XR for Data Visualization*. Presented at the SURF National XR Day, Delft, The Netherlands. *

Raposo, P. and Brown, R. (2018). *Implementing a Discrete Global Grid System (DGGS): A New Open Geospatial Consortium (OGC) Standard*. Presented at the Knoxville FOSS4G Meeting, Knoxville, TN. *

Raposo, P. (September 20th, 2018). Introduction to Geospatial Computing for Pythonistas. Presented to Knox-Data Computing Club, Knoxville, Tennessee. *

Raposo, P. (2017). *Open-Source Flow Maps with Cubic Splines*. Presented at the North American Cartographic Information Society (NACIS) Annual Meeting, Montreal, Canada. *

Raposo, P. (2017). Terrain Data Sources Online & DEMs from LiDAR with SAGA. Presented at the Knoxville FOSS4G Meeting, Knoxville, TN. *

Stanislawski, L. V., Buttenfield, B. P., and Raposo, P. (2016). Assessment of Hydrographic Line Feature Geometry to Support Multi-Scale Representation. Presented at the American Association of Geographers Annual Meeting, San Francisco.

Raposo, P. (2015). Terrain Data Sources Online. Presented at the North American Cartographic Information Society (NACIS) Annual Meeting, Minneapolis. *

Brewer, C.A., Guidero, E. M., Dennis, A., Limpisathian, B. P., Frye, C., Raposo, P. (2015). *Making a New Edition of* Designing Better Maps. The Association of American Geographers (AAG) Annual Meeting, Chicago.

Brewer, C. A., Raposo, P., Guidero, E., Meckler, K., Price, C. (2013). *Multiscale Design for* The National Map *2012/13*. The USGS Center of Excellence for Geospatial Information Science (CEGIS) All-Hands Meeting, Rolla, Missouri. *

Raposo, P., Brewer, C. A., and Robinson, A. C. (2013). *Mapping Around the World: A Cartographic Study Abroad Experience*. The Association of American Geographers (AAG) Annual Meeting, Los Angeles. *

Brewer, C. A., Robinson, A. C., and Raposo, P. (2012). *Mapping Around the World: A Cartographic Study Abroad Experience*. The North American Cartographic Information Society (NACIS) Annual Meeting, Portland, Oregon.

Brewer, C. A., and Raposo, P. (2012). *Multiscale Design for* The National Map *of the U.S.* The Association of American Geographers (AAG), Middle States Division Annual Meeting, Shippensburg, PA.

Raposo, P., Sparks, K. and Brewer, C. A. (2012). *Techniques for Cartographic Presentation of Upsampled Raster Land Cover Data*. The North American Cartographic Information Society (NACIS) Annual Meeting, Portland, Oregon. *

Brewer, C. A., Stauffer, A., Raposo, P., Butzler, S. J., & Thatcher, J. (2011). *Electronic Topographic Map Design*. The USGS Center of Excellence for Geospatial Information Science (CEGIS) All-Hands Meeting, Rolla, Missouri.

Raposo P. (2011). *Scale-Specific Automated Map Line Simplification by Vertex Clustering on a Hexagonal Tessellation*. Poster. The North American Cartographic Information Society (NACIS) Annual Meeting, Madison, Wisconsin. *

Software

Raposo, P. and Brown, R. (2018). QTM Generator. Knoxville, TN: Paulo Raposo and Randall Brown. Open source, available from https://github.com/paulojraposo/QTM.

Raposo, P. (2016). FlowMaps. Knoxville, TN: Paulo Raposo. Open source, available from https://github.com/paulojraposo/FlowMaps.

Raposo, P. (2013). HexQuant. State College, PA: Paulo Raposo. Open source, available from https://github.com/paulojraposo/HexQuant.

Book Reviews & Interviews

Raposo, P. (2018). Review of Cartography: An Introduction, 2nd Edition, by Giles Darkes and Mary Spence MBE. *The Cartographic Journal,* 55(3), 299-300.

Raposo, P. (2014). Review of Making Maps: A Visual Guide to Map Design for GIS, 2nd Edition, by John Krygier and Dennis Wood. *Cartographic Perspectives*, 74, 78-79.

Raposo, P., and Strebe, D. (2013). Interview with a Celebrity Cartographer: Daniel (daan) Strebe. *Cartographic Perspectives,* 75, 63-66.

Reports

Khan, K., Arino, J., Calderon, F., Chan, A., Gardam, M., Heidebrecht, C., Hu, W., Janes, D. A., Macdonald, M., Sears, J., Raposo, P., Wang, S. (2009). An analysis on Canada's vulnerability to emerging infectious disease threats via the global airline transportation network. Toronto: Biodiaspora, The Centre for Research on Inner City Health, St. Michael's Hospital. Available at http://www.biodiaspora.com/PHACReport/low_res.pdf.

Maps Contributed in Publications by Peers

Brewer, Cynthia A. (2016). Designing Better Maps, 2nd Edition. Esri Press, Redlands, USA.

Jampel, C. (2016). Cattle-based livelihoods, changes in the taskscape, and human-bear conflict in the Ecuadorian Andes. *Geoforum*, 69, 84-93.

Derickson, K. D. (2014). The Racial Politics of Neoliberal Regulation in Post-Katrina Mississippi. *Annals of the Association of American Geographers*, 104(4), 889–902.

Tutu, R. A. (2013). Exploring Social Resilience Among Young Migrants in Old Fadama, an Accra Slum. In J. R. Weeks, A. G. Hill, & J. Stoler (Eds.), *Spatial Inequalities* (pp. 89–107). Springer, Netherlands.

Tutu, R. A. (2013). Self-Rated Resilience Among Young Migrants in Old Fadama, Accra, Ghana. *GeoJournal*, *78*(4), 709–725.

Florida, R., and Jackson, S. (2010). Sonic City: The Evolving Economic Geography of the Music Industry. *Journal of Planning Education and Research*,29(3), 310–321.

Florida R. Who's Your City?: How the Creative Economy is Making Where to Live the Most Important Decision of Your Life. Canadian ed. Toronto: Vintage Canada; 2009.

Teaching

Undergraduate

Intermediate Geographic Information Science (GEOG411), University of Tennessee, Knoxville, Spring 2018, Spring 2019.

First Steps in GIS Programming (GEOG312), University of Tennessee, Knoxville, Fall 2017 & Fall 2018. *Original course, designed and offered*.

Geovisualization and Geographic Information Science (GEOG311), University of Tennessee, Knoxville, Fall 2017.

Our Digital Earth (GEOG111), University of Tennessee, Knoxville, Spring 2017, Fall 2017.

Landforms of the World (GEOG115), Penn State University, Spring 2015, *Teaching Assistant*.

Introduction to GIS (GEOG363), Penn State University, Fall 2013 through Fall 2014.

Graduate

Geographic Concept and Method (GEOG599), University of Tennessee, Knoxville, Fall 2018.

Independent Study: GIS Programming in Python (GEOG593), University of Tennessee, Knoxville, Fall 2017.

GIS Project Management (GEOG518), University of Tennessee, Knoxville, Spring 2017, Spring 2019.

Memberships and Associations

Cartography and Geographic Information Society (CaGIS), 2012-2016.

DesignLab Fellow, University of Twente, April 2021 to present.

North American Cartographic Information Society (NACIS) member, 2010 to present.

Open Science Twente (OSCT), University of Twente, April 2021 to present.

Disciplinary Service

Administration

Co-Chair, International Cartographic Association (ICA) Commission on Generalisation and Multiple Representation. August 2017 to January 2023.

Thesis Coordinator, International Cartography Erasmus Mundus Master of Science Programme (TU Munchen, TU Vienna, TU Dresden, and Universiteit Twente). https://cartographymaster.eu. 2019 to 2020.

Communications Chair, University Consortium for Geographic Information Science (UCGIS). July 2018 to June 2019.

Secretary, Cartography and Geographic Information Society (CaGIS) Board. Fall 2012 to Winter 2016.

Student Executive Board Member, North American Cartographic Information Society (NACIS). October 2013 to October 2014.

Active poster at Geographic Information Systems StackExchange (gis.stackexchange.com).

Moderator for the Pennsylvania National Geographic Society State Geography Bees. 2010, 2011 and 2012.

Journal Editorial Board Membership

Geoinformatica Polonica, Scientific Council. 2023 to present.

Manuscript Reviewing

Cartographica

The Cartographic Journal

Cartographic Perspectives

Computers, Environment and Urban Systems

Geographical Analysis

Hydrologic Processes

IEEE Information Visualization (InfoVis) 2019 Conference

International Cartographic Conference

International Cartographic Association Workshop on AI, Geovisualization, and Analytical Reasoning (CartoViz24)

International Cartographic Association Workshop on Generalisation and Multiple Representation

International Symposium on Graph Drawing & Network Visualization (GD2015)

International Journal of Applied Earth Observation and Geoinformation

International Journal of Geographical Information Science (IJGIS)

ISPRS International Journal of Geo-Information (IJGI)

Journal of Geovisualization and Spatial Analysis

Journal of Maps

Journal of Spatial Information Science (JOSIS)

Spatial Cognition and Computation

Transactions in GIS

UCGIS Geographic Information Science & Technology Body of Knowledge

Awards Received

Faculty ITC Teacher of the Year, 2023–2024.

Geo-Informatie Nederland (GIN) Cartography Prize 2020, for maps in the Journal of Maps publication "Epidemics and pandemics in maps - the case of COVID-19." Shared with co-authors Franz-Benjamin Mocnik, Paulo Raposo, Wim Feringa, Barend Köbben and Menno-Jan Kraak. Awarded November 24th, 2020.

E. Willard Miller Award for Best Ph.D. Paper in Geography, Department of Geography, Penn State University, 2016.

Cartography and Geographic Information Society (*CaGIS*) Ph.D. Scholarship Award, 2012.

Penn State Department of Geography Outstanding Research Assistant Award, 2012.

Cartography and Geographic Information Society (*CaGIS*) Master's Scholarship Award, 2010.

The Walter and Mary Tuohy Award in Arts and Science, University College, University of Toronto, 2007.

The Counseling Foundation of Canada Bursary for Volunteer Service, Victoria University, University of Toronto, 2007.

The Teetzel Traveling Award, University College, University of Toronto, 2006.

The Ruby M. Jolliffe Scholarship-Bursary, Victoria University, University of Toronto, 2006.

Outstanding Performance Award, Historical Geography of the Americas course, University of Toronto, 2005.

The University of Toronto Arbor Scholarship, 2000.

Pre-Professorship Experience

Research Assistant for Dr. Donna Peuquet, Fall 2015 to Summer 2016

I worked on Dr. Peuquet's STempo project at the GeoVISTA Center, Department of Geography, Penn State University. I provided cartographic redesign to the STempo application interface, as well as new graph and spatial intersection calculation functionality. My work involved traditional cartographic design and GIS algorithm implementation in Java.

Research Assistant for Dr. Cynthia Brewer, Fall 2010 to Summer 2013

For three years I worked with Dr. Brewer, in collaboration with USGS cartographers, on the redesign of the US Topo topographic series. We focused our efforts on designing for orthoimagery, new vector and label symbology, and the development of an upsampled raster land cover layer suitable to 1:24,000 mapping derived from the 30 m resolution National Land Cover Dataset (NLCD). Several of Dr. Brewer's and my own design elements are being implemented into US Topo.

Summer Intern at Esri Mapping Center, Summer 2010

I worked with Charlie Frye and Aileen Buckley as a member of the Mapping Center team at Esri in Redlands, California. My work involved several small projects in support of the Mapping Center's work, which was to inform and assist GIS users in the use of Esri software in making great maps. Among my projects, I used ArcMap to recreate the "Oregon in the World" map from the well-respected "Atlas of Oregon." I also saw to several mapping projects in preparation for the 2010 Esri User Conference.

Research Assistant for Dr. Cynthia Brewer and Dr. Alan MacEachren, Fall 2009

I worked for Dr. Brewer, reviewing a collection of topographic maps from around the world for stylistic variation in hydrographic symbolization. Our research was written in a report circulated among peers at the USGS. For Dr. MacEachren, I reviewed a geovisualization application developed at the GeoVISTA Centre (Penn State), and wrote scenarios for use in software design.

Martin Prosperity Institute, University of Toronto, 2008 and 2009

From the summer of 2008 through July 2009 I was the resident cartographer at the Martin Prosperity Institute in Toronto, part of the Rotman School of Management, University of Toronto. I was involved in map making for diverse projects undertaken by the Institute and my colleagues therein. As part of this work, I drew the maps for Dr. Richard Florida's Canadian edition of his book *Who's Your City?*, as well as those in Dr. Florida's article *Sonic City: The Evolving Economic Geography of the Music Industry*.

Centre for Research on Inner City Health, St. Michael's Hospital, Toronto, 2008 and 2009

I worked with Dr. Kamran Khan in his research into the spread of diseases around the world by commercial airline passenger traffic. His project, then called BioDiaspora and now renamed and presented on-line at bluedot.global, seeks to better understand connectivity between world cities, so as to suggest wiser choices with regard to disease prevention. My work on the team was to design and draw the cartographic depictions of the analyses at various geographic scales using GIS.

Tell Madaba Archaeological Project, Madaba, Jordan, June and July of 2006 and 2007

As an invited staff member during the 2007 summer field season, I planned and executed the continued topographic survey of the environs of Tell Ma'in by total station, building upon data I helped to gather during the 2006 season as a student. In addition to surveying, I was also taught excavation field methods to the 2007 field school students.