

High-Performance Computing (HPC) Research Project

The HPC project evolved from the Multi-Resolution Raster (MRR) research project and it focuses on efficient processing of geospatial data in the supercomputing domain for the benefit of spatial analytics and spatial data handling. This investigation is highly applicable to our research vision within CEGIS of massive, quick processing and production of National Geospatial Program (NGP) products.

Publications and Reports			
Title	Size	Citation	Year
Shapes on a plane: evaluating the impact of projection distortion on spatial binning	86 KB pdf file	Battersby, Sarah E., Daniel "daan" Strebe, & Michael P. Finn (2016): Shapes on a plane: evaluating the impact of projection distortion on spatial binning, <i>Cartography and Geographic Information Science</i> , DOI: 10.1080/15230406.2016.1180263.	2016
Determining Optimal Post Spacing for Lidar DEM Creation Using Open Source and Commercial Software	86 KB pdf file	Finn, Michael P., Frank E. Velasquez, and Kristina H. Yamamoto (2015). Determining Optimal Post Spacing for Lidar DEM Creation Using Open Source and Commercial Software. Abstract presented at the GIS in the Rockies 2015 conference. Presented by Velasquez and Yamamoto.	2015
A solution for processing large files in the LASer (LAS) format using the message passing interface (MPI) and parallel file systems	272 KB pdf file	Wendel, Jeffrey, Michael P. Finn, John Kosovich, Jeff Falgout, and Yan Liu (2015) A solution for processing large files in the LASer (LAS) format using the message passing interface (MPI) and parallel file systems. In Proceedings 27th International Cartographic Conference Pre-conference workshop on Spatial data infrastructures, standards, open source and open data for geospatial (SDI-Open 2015), Serena Coetzee, Silvana Camboim, Antony K Cooper, Suchith Anand, Trevor Taylor, Rogerio Borba, Julia Strauch	2015

		(Editors), pages 45-50. ISBN 978-1-77592-117-2.	
Implications of Web Mercator and Its Use in Online Mapping	1434 KB pdf file	Battersby, Sarah E., Michael P. Finn, E. Lynn Usery, and Kristina H. Yamamoto (2014). <i>Implications of Web Mercator and Its Use in Online Mapping</i> . <i>Cartographica</i> . Vol. 49 No. 2, pp. 85–101, doi: 10.3138/cart0.49.2.2313.	2014
Small Scale Raster Map Projection using the Compute Unified Device Architecture (CUDA)	76 KB pdf file	Finn, Michael P., Jing Li, and David M. Mattli (2014). Small-Scale Raster Map Projection using the Compute Unified Device Architecture (CUDA). Abstract presented for the ISPRS Technical Commission IV Symposium on Geospatial Databases and Location Based Services, Suzhou, China.	2014
High-Resolution National Elevation Dataset: Opportunities and Challenges for High-Performance Spatial Analytics	83 KB pdf file	Liu, Yan, Michael P. Finn, Babak Behzad, and Eric Shook (2013). High-Resolution National Elevation Dataset: Opportunities and Challenges for High-Performance Spatial Analytics. Abstract presented in the Special Session on "Big Data," American Society for Photogrammetry and Remotes Sensing Annual Conference. Baltimore, Maryland.	2013
pRasterBlaster: High-Performance Small-Scale Raster Map Projection Transformation Using the Extreme Science and Engineering Discovery Environment	11.4 KB pdf file	Finn, Michael P., Yan Liu, David M. Mattli, Qingfeng (Gene) Guan, Kristina H. Yamamoto, Eric Shook and Babak Behzad (2012). pRasterBlaster: High-Performance Small-Scale Raster Map Projection Transformation Using the Extreme Science and Engineering Discovery Environment. Abstract presented at the XXII International Society for Photogrammetry & Remote Sensing Congress, Melbourne, Australia	2012
A Performance Profiling Strategy for High-Performance Map Re-Projection of Coarse-Scale Spatial Raster Data	31.2 KB pdf file	Behzad, Babak, Yan Liu, Eric Shook, Michael P. Finn, David M. Mattli, and Shaowen Wang (2012). A Performance Profiling Strategy for High-Performance Map Re-Projection of Coarse-Scale Spatial Raster Data. Abstract presented at the Auto-Carto 2012, A	2012

		Cartography and Geographic Information Society Research Symposium, Columbus, OH.	
A Program for Handling Map Projections of Small Scale Geospatial Raster Data	2.1MB pdf file	Finn, Michael P., Daniel R. Steinwand, Jason R. Trent, Robert A. Buehler, David Mattli, and Kristina H. Yamamoto (2012). A Program for Handling Map Projections of Small Scale Geospatial Raster Data. Cartographic Perspectives, Number 71, pages 53 – 67.	2012
User's Guide for mapIMG 3—Map Image Re-Projection Software Package	3.4mb pdf file	Finn, M.P., and Mattli, D.M., (2011) User's guide for mapIMG 3—Map image re-projection software package: U.S. Geological Survey Open-File Report 2011–1306, 12 p.	2011
Coordinate Systems and Map Projections	4.09mb pdf file	Usery, E.L., Finn, M.P., and Mugnier, C.J., (2009). Coordinate Systems and Map Projections. <i>Manual of Geographic Information Systems</i> . Ed. Marguerite Madden. Bethesda, MD: American Society for Photogrammetry and Remote Sensing, 2009. 87-112. Print.	2009
Rapid Raster Projection Transformation and Web Service Using High-performance Computing Technology	13k pdf file	Guan, Q., Finn, M.P., Usery, E.L., and Mattli, D.M., (2009). Rapid raster projection transformation and web service using high-performance computing technology. (Abstract) Presented at the Association of American Geographers Annual Meeting. March 25, 2009, Las Vegas, Nevada.	2009

Presentations			
Title	Size	Citation	Year
Determining Optimal Post Spacing for Lidar DEM Creation Using Open Source and Commercial Software	2624 KB ppt file	Finn, Michael P., Frank E. Velasquez, and Kristina H. Yamamoto (2015). Determining Optimal Post Spacing for Lidar DEM Creation Using Open Source and Commercial Software. Abstract presented at the GIS in the Rockies 2015 conference. Presented by Velasquez and Yamamoto.	2015
Using the Message Passing Interface (MPI) and Parallel File Systems for Processing	2248 KB ppt file	Wendel, Jeffrey, Michael P. Finn, John Kosovich, Jeff Falgout, and Yan Liu (2015) A solution for processing large	2015

Large Files in the LAS Format		files in the LASer (LAS) format using the message passing interface (MPI) and parallel file systems. Abstract presented at the 27th International Cartographic Conference Pre-conference workshop on Spatial data infrastructures, standards, open source and open data for geospatial (SDI-Open 2015), 20-21 August 2015, Brazilian Institute of Geography and Statistics (IBGE), Rio de Janeiro, Brazil	
Small Scale Raster Map Projection using the Compute Unified Device Architecture (CUDA)	1803 KB ppt file	Finn, Michael P., Jing Li, and David M. Mattli (2014). Small-Scale Raster Map Projection using the Compute Unified Device Architecture (CUDA). Abstract presented for the <i>ISPRS Technical Commission IV Symposium on Geospatial Databases and Location Based Services</i> , Suzhou, China.	2014
Geospatial Analytics for Government Agencies and the General Public: The CyberGIS Toolkit as an Enabler	2919 KB ppt file	Finn, Michael P. (2014). Geospatial Analytics for Government Agencies and the General Public: The CyberGIS Toolkit as an Enabler. Presented in the <i>High Performance Computing and Geospatial Analytics Workshop</i> . Argonne National Laboratory, Lemont, Illinois.	2014
Open GIS: USGS CEGIS' Technical and Implementation Issues	2209 KB ppt file	Finn, Michael P. (2014). Open GIS: USGS CEGIS' Technical and Implementation Issues. Presented in the <i>Open GIS Workshop</i> . Tampa, Florida.	2014
CyberGIS Toolkit: A Software Toolbox Built for Scalable cyberGIS Spatial Analysis and Modeling	294 KB ppt file	Liu, Yan, Michael P. Finn, Hao Hu, Jay Laura, David Mattli, Anand Padmanabhan, Serge Rey, Eric Shook, Kornelijus Survila, and Shaowen Wang (2013). CyberGIS Toolkit: A Software Toolbox Built for Scalable cyberGIS Spatial Analysis and Modeling. <i>Presented at the CyberGIS All-Hands Meeting 2013</i> . Seattle, Washington.	2013
High-Resolution National Elevation Dataset: Opportunities and Challenges for High-	3598 KB ppt file	Liu, Yan, Michael P. Finn, Babak Behzad, and Eric Shook (2013). High-Resolution National Elevation Dataset: Opportunities and Challenges for High-Performance	2013

Performance Spatial Analytics		Spatial Analytics. Abstract presented in the Special Session on "Big Data," American Society for Photogrammetry and Remotes Sensing Annual Conference. Baltimore, Maryland.	
A Performance Profiling Strategy for High-Performance Map Re-Projection of Coarse-Scale Spatial Raster Data	938.5 KB ppt file	Behzad, Babak, Yan Liu, Eric Shook, Michael P. Finn, David M. Mattli, and Shaowen Wang (2012). A Performance Profiling Strategy for High-Performance Map Re-Projection of Coarse-Scale Spatial Raster Data. Abstract presented at the Auto-Carto 2012, A Cartography and Geographic Information Society Research Symposium, Columbus, OH	2012
pRasterBlaster: High-Performance Small-Scale Raster Map Projection Transformation Using the Extreme Science and Engineering Discovery Environment	1.5MB ppt file	Finn, Michael P., Yan Liu, David M. Mattli, Qingfeng (Gene) Guan, Kristina H. Yamamoto, Eric Shook and Babak Behzad (2012). pRasterBlaster: High-Performance Small-Scale Raster Map Projection Transformation Using the Extreme Science and Engineering Discovery Environment. Abstract presented at the <i>XXII International Society for Photogrammetry & Remote Sensing Congress</i> , Melbourne, Australia.	2012
Raster Map Projection Transformation Using a Virtual System to Interactively Share Computing Resources	416KB ppt file	Finn, Michael P., Yan Liu, David M. Mattli, Babak Behzad, Kristina H. Yamamoto, Anand Padmanabhan, and Michael Stramel (2012). Raster Map Projection Transformation Using a Virtual System to Interactively Share Computing Resources. Presentation made at <i>The First International Conference on Space, Time, and CyberGIS (CyberGIS'12)</i> , Urbana-Champaign, Illinois.	2012
pRasterBlaseter: Fast, Accurate Raster Reprojection	177.2KB pdf file	Mattli, David, Michael P. Finn, and Michael Stramel (2012). pRasterBlaseter: Fast, Accurate Raster Reprojection. Poster presented at <i>The First International Conference on Space, Time, and CyberGIS (CyberGIS'12)</i> , Urbana-Champaign, Illinois.	2012

<p>Digitization of the <i>Bibliography of Map Projections</i></p>	<p>649k pptx file</p>	<p>Wood, E.C., Finn, M.P., and Usery E.L., (2011). Digitization of the Bibliography of Map Projections. (Poster) Presented at the 25th International Cartographic Conference. July 2011, Paris, France</p>	<p>2011</p>
<p>Rapid Raster Projection Transformation and Web Service Using High-performance Computing Technology</p>	<p>2.3mb ppt</p>	<p>Guan, Q., Finn, M.P., Usery, E.L., and Mattli, D.M., (2009). Rapid raster projection transformation and web service using high-performance computing technology. (Presentation) Presented at the Association of American Geographers Annual Meeting. 25 March 2009, Las Vegas, Nevada.</p>	<p>2009</p>