Conference Committee

Allison Anderson, UW Libraries
Victoria Buschman, UW Libraries
Kian Flynn, UW Libraries
Harvey Greenberg, UW Earth and Space Sciences
Madeline Mundt, UW Libraries
Matthew Parsons, UW Libraries
Elliott Stevens, UW Libraries
Steven Walters, UW Earth and Space Sciences

Proceedings Editors

Kian Flynn, UW Libraries

Madeline Mundt, UW Libraries

Matthew Parsons, UW Libraries

Cover Design

Erika Bailey, UW Libraries

The Second Annual UW GIS Symposium
May 17, 2018
Research Commons – Allen Library
Seattle, WA

Schedule

Welcome & Keynote	9 am – 10 am
• *Mapping Child Growth Failure in Africa between 2000 and 2015* Dr. Simon Hay, Institute of Health Metrics & Evaluation	
Lightning Talks	10 am – 11 am
Poster Presentations	11 am – 12 pm

Table of Contents

Preface from *Proceedings* Editors

The 2nd Annual University of Washington (UW) GIS Symposium was held on May 17, 2018 in the University of Washington Libraries' Research Commons, an interdisciplinary space devoted to highlighting student research. This year's symposium continued its mission of creating an opportunity for faculty, students, and staff across disciplines to come together and share their GIS-related research.

Dr. Simon Hay kicked off the symposium with a talk on IHME's (Institute for Health Metrics and Evaluation) work in Africa on child growth failure. Dr. Hay, the Director of Geospatial Science at IHME, spoke on the power of GIS and mapping to identify sub-national differences in child growth rates and highlight geographical inequities within countries.

After the keynote, UW students and staff from a wide variety of disciplines and departments presented lightning talks and posters. Presenters represented several different UW Seattle and UW Bothell campus departments including CEP (Community, Environment, and Planning), SEFS (School of Environmental and Forest Sciences), Polar Science Center, UW Libraries, Geography, Health Services, Oceanography, LSJ (Law, Societies, and Justice), and Built Environments. A total of 8 lightning talk and 10 poster proposals were reviewed and accepted by the conference committee. Each lightning talk presenter delivered a five-minute oral presentation supported by visual slides; each poster presenter attended the event and was on hand to answer audience questions. An open Q&A followed the lightning talk portion of the event. Abstracts from the lightning talks and posters are included in these *Proceedings* below.

This year's symposium was open to all members of the UW community and the public and was attended by over 55 people. We would like to thank everyone who contributed to the success of this year's UW GIS Symposium. Special thanks goes to members of the GIS Symposium planning committee for their numerous contributions, the staff of the Research Commons for being gracious hosts of the event, and to the UW Libraries for sponsoring refreshments.

Proceedings Editors

Kian Flynn
UW Libraries

Madeline Mundt
UW Libraries

Matthew Parsons
UW Libraries

Keynote Address

Mapping Child Growth Failure in Africa between 2000 and 2015

Dr. Simon Hay, Professor of Global Health and Director of Geospatial Science
Institute for Health Metrics and Evaluation

Insufficient growth during childhood is associated with poor health outcomes and an increased risk of death. Between 2000 and 2015, nearly all African countries demonstrated improvements for children under 5 years old for stunting, wasting, and underweight, the core components of child growth failure. Here we show that striking subnational heterogeneity in levels and trends of child growth remains. If current rates of progress are sustained, many areas of Africa will meet the World Health Organization Global Targets 2025 to improve maternal, infant and young child nutrition, but high levels of growth failure will persist across the Sahel. At these rates, much, if not all of the continent will fail to meet the Sustainable Development Goal target—to end malnutrition by 2030. Geospatial estimates of child growth failure provide a baseline for measuring progress as well as a precision public health platform to target interventions to those populations with the greatest need, in order to reduce health disparities and accelerate progress.

Simon I Hay, BSc, DPhil, DSc, is a Professor of Global Health at the at the University of Washington and Director of Geospatial Science at the Institute for Health Metrics and Evaluation (IHME). His career has focused on spatial and temporal aspects of infectious disease epidemiology to support the more rational implementation of disease control and intervention strategies. He now leads an international collaboration of researchers, from a wide variety of academic disciplines, with the objective of improving the outputs and outcomes of infectious disease cartography.

Lightning Talk Abstracts

Using GIS to Support Reentry Planning for Youth Exiting the Juvenile Justice System

Elaine Albertson, Health Services
emalb@uw.edu

Case managers and policymakers don't always know what service environments youth go home to after finishing their sentence in the juvenile justice system. GIS can be used to highlight spatial gaps in physical health, mental health, and social services for youth in this population. However, many juvenile justice agencies have limited resources for GIS analysis. This presentation provides an example of how free and open source GIS software, and readily available data, can be used to assess the reentry environments of youth exiting incarceration, using a case study of Washington State DSHS Juvenile Rehabilitation.

Safe Consumption Site Suitability Map

Hanna Peterson, Community, Environment & Planning
hannanp@uw.edu

This project looks at the optimal location for a safe consumption site in King County. King County has secured the funding for this facility, but the question remains where it will go. This project uses a suitability model based on the following factors: proximity to businesses, schools, and residential areas, transit routes, and current crime rates. This map is a final project for Dr. Walter's Real Estate 370 class.

Mapping Our Realities in the Pacific Northwest Natives Geodatabase

Victoria Buschman, School of Environmental & Forest Sciences
vbuschmn@uw.edu

The Pacific Northwest Natives Geodatabase is a small, ongoing project conducted by the GIS Graduate Staff Assistant at the University of Washington Libraries. The geodatabase is intended to be an outward-facing collection of geospatial data on Native communities and scholarship that is to be the largest collection of its kind at any institution. The dream vision is for a public platform that

serves Native communities, Indigenous scholarship, tribal organizations, and public researchers in an effort to validate and decolonize data on Native Peoples.

Arctic Science with GIS

Harry Stern and Kristin Laidre, Polar Science Center
harry@apl.washington.edu

The UW's Polar Science Center utilizes GIS in myriad ways, including tracking polar bears fitted with satellite transmitters, mapping the overlap of the Northwest Passage with marine mammal habitat, and studying the declining extent of sea ice. This lightning talk presentation gives a brief overview of a few projects happening at the Polar Science Center and details of a GIS analyst position opening up at the center in 2018.

Affordable Housing

Michael Monroe, Community, Environment & Planning
mmonro@uw.edu

In the Northwest Arctic of Alaska, engagement and motivation around wildlife conservation and natural resource use is growing alongside the need to protect healthy population dynamics for key subsistence species. Over the millennia that Native communities have occupied this landscape, they have accumulated acutely accurate place-based natural history knowledge that complements the information collected by, and available to, natural resource managers and land use planners. The Northwest Arctic Borough Subsistence Mapping Project is a prime example of how geographic information systems can bridge Indigenous knowledge and western science in constructing models for species' distributions, migration patterns, and other ecosystem dynamics both spatially and temporally for use in conservation and land use planning.

Two Geospatial Data Resources @ Your Library That You Need to Know

Matthew Parsons and Kian Flynn, UW Libraries
parsonsm@uw.edu

The University of Washington Libraries subscribes to two web-based mapping and data visualization resources: SimplyAnalytics and PolicyMap. Both platforms pull geospatial data from a variety

of governmental and private sources. PolicyMap, which the UW Libraries started a subscription with in fall 2017, offers several special features like their 3-layer maps, custom-made reports, and Data Loader. This talk will provide a general overview of each resource, compare and contrast the two resources, and highlight their utility as sources of U.S. demographic data for GIS research.

Spatial Literacy and Ocean Science and Technology

Miles Logsdon, Oceanography
mlog@uw.edu

Many have called for a purposeful and strategic approach to elevating spatial literacy in all aspects of public decision making (Goodchild 1992, Kuhn 2012, Newcombe 2013). In the Ocean Sciences, spatial thinking is compounded by the requirement to consider vertical and temporal dimensions as well as the remoteness and the literal impossibility of making repeatable observations. Like other physical earth sciences, the marine geospatial scientists will make use of various raster and vector representations, a selection of classic projection, and a unique vocabulary for identifying spatial objects. At the same time, ocean science issues (sea level rise, ocean acidification, marine plastics) are becoming more "mainstream" and now may even find their way into a political debate. Technology in ocean data acquisition, representation, and dissemination has enabled more people to become aware how little is known about the world's oceans, and with that awareness has come the need for trusted data. This presentation reviews a few of the key "spatial thinking" concepts that, if integrated into the ocean science vernacular, would assist marine geospatial scientist in communicating their work. Also, some of the advances in observational ocean technology is presented and how these technologies open new opportunities to "mainstreaming" ocean science in public debate.

Determining Park Level of Service in the City of Lake Forest Park

Collene Gaolach, Social Development Research Group
rasmuscj@uw.edu

In March 2018, the City of Lake Forest Park released a draft Parks, Recreation, Open Space, & Trails (PROST) Plan. The PROST Plan uses the Washington State Recreation and Conservation Office level of service standards to guide its assessment of the current park level of service. However, the PROST Plan bases its assessment using a methodology that does not consider actual walking routes to the park. This talk will compare the level of service shown using this methodology to one which does take walking routes into consideration. A StoryMap related to this project is available at the following web address: https://arcg.is/1aaivK.

Poster Presentation Abstracts

Remote Sensing

Ivan Barton, School of Environmental and Forest Sciences
ivan.barton@gastudent.nyme.hu

The first Sentinel-2 satellite was sent to orbit in 2015 as part of the European Copernicus program. It provides free, high resolution Earth observation data on global scale, collecting an incredible amount of data (1.6 TB/orbit). In the past, image interpretation was done by human operators, but in the last few decades computer vision has played a significant role in mapping due to the increasing data volume. With object based image analysis (OBIA) the mapping quality could approach or even overtake the man-made maps with high resolution images. The first and most important step in OBIA is the image segmentation, wherein the image is taken apart into homogenous regions. The state of art image segmentation methods are not frequently used in satellite remote sensing. Most modern methods are data driven, which perform well in artificial environment, but fail in natural environment due to the lack of training data. Therefore the older, unsupervised image segmentation algorithms are preferred by users. There are several commercial and open source OBIA solutions for processing long time series in order to extract thematic information. However, all of them have strengths and weaknesses which limits their research and operational applications. To overcome this problem, we implemented a modified multiresolution image segmentation algorithm which could be utilized for Sentinel-2 data processed in High Performance Computing (HPC) environments.

Transit Oriented Development in the Palm Beaches

Samuel Justice Albee, Community, Environment, and Planning
salbee@uw.edu

With the creation of the new Coastal Link Tri-Rail extension in South Florida, there is a large opportunity for the region to utilize space more efficiently and equitably. This project uses suitability analysis and GIS to examine and evaluate potential sites for strategic redevelopment and the construction of transit-oriented development. The South Florida area is largely dependent on car usage, even in the urban cores. The current commuter train is west of the most densely populated areas, however the new Coastal Link will run through the most densely populated areas, providing more connectivity within the region. Additionally, the new high-speed Brightline train will run on the same tracks, acting as an express service. With these new infrastructure projects, the traditionally sprawling South Florida has the opportunity to develop into a more sustainable and equitable region.

Rental Real Estate for Commuters

Mitchell Higgins, Law, Societies, and Justice / Real Estate
mitchelldhiggins@hotmail.com

Western Washington residents near the Seattle metropolitan area are running out of living options, and major cities near the Puget Sound are where many major employers are located. These employers were identified as Microsoft (Redmond), Boeing (Everett and Seattle), Amazon (Seattle), and the University of Washington (Seattle and Bothell). Although there are some vacancies in the city and surrounding area, price has driven many who are seeking to rent residential real estate to look outside of heavily urbanized areas. Some commuters who rent are doing so as they look for long term housing (buying) as they are often from out of state or even out of the country. Specified locations that proved to be consistently listed as undesirable were the cities of Everett, Redmond, and Seattle. Five metrics are used for a suitability analysis: Price, travel time, Schooling, crime, and population density.

China Linpan Landscape Ecology Assessment

Shuang Wu and Fengyi Xu, Landscape Architecture
shuangw1@uw.edu

This study focuses on a unique agricultural landscape in Southwest China called Linpan. It has been used by the local residents for thousands of years and has been utilized for its high food productivity and high resiliency. However, during recent years of rapid urbanization in China, this landscape is under threat. Due to its uniqueness and outstanding ecological and social value, this talk analyzes how quickly this landscape is degrading, how to quantify the fragmentation of this landscape and what its relationship is to urbanization indicators such as road construction. Tools used include the GIS landscape metrics calculation package Fragstats.

Stronger Communities, Healthier People

Thomas Paine, Urban Planning
thomthom1250@yahoo.com

This poster looks at a suitability model, using ArcGIS Pro, for identifying the best places for community gardens. These gardens will be built on community members' front lawns so that they can be readily available, especially in areas classified as food deserts. This poster focuses on Little Rock, Arkansas, as this is one of the most obese cities in the country. In addition to community gardens supplying healthy wholesome food to residents, it is also important to recognize that this activity provides neighbors the opportunity to actually get to know one another and helps build a stronger sense of community identity. This is a final project for Dr. Walter's course RE 370: Real Estate Data Modeling.

Farm to School Site Suitability Analysis in Minneapolis, MN

Sophia Alhadeff, Geography
salhadef@macalester.edu

A team of Macalester students conducted a site suitability analysis to decide a viable plot of land to develop into an urban farm. This study was conducted in partnership with an elementary school in Minneapolis, Minnesota to combat food insecurity. The location chosen was based on a suitability analysis that included socioeconomic and racial demographic information, as well as the number of households using SNAP benefits.

Opportunity Index – King & Pierce Counties

Marvin Acosta, Geography
acostm@uw.edu

This poster examines the differences in the geography of opportunity between two major counties, King County and Pierce County, both located in Washington State. There are increasing rates of movement of individuals relocating from King County to Pierce County as a result of housing affordability pressures. This phenomenon led to the question of where opportunities were highest, and which county had higher opportunities overall.

Evaluating King County Population's Cardiovascular Mortality Risk Factors: A GIS-based Approach

Minyou Yang, Bothell Interdisciplinary Arts & Sciences – Environmental Science
myang915@uw.edu

Social-economic disparity has been shown to be one of the most significant risk factors in influencing a population's health. Some factors that project this disparity include accessibility to fresh food options, green spaces, and healthcare; these amenities are unevenly distributed geographically similar to disease occurrence patterns. This study aims to use geographic information system (GIS) tools to depict the relationship between cardiovascular disease-induced mortality rate and accessibility to amenities such as farmer's markets, food facilities, parks, and health insurances. We also used the target population's demographic information such as age distribution, sex ratio, ethnicity, and population density in each census tract as our controlled variables. For all census tracts in King County (n=396), we determined each census tract's accessibility to facilities by considering the count of facilities in each tract and the Euclidean distance from each centroid to the nearest facility as indicators of accessibility. We considered that neighboring census tracts will likely influence each other, so we used Moran's I to test spatial autocorrelation. We used spatial lag, spatial error which found R2=0.37,0.38 and variables such as the number of people with insurance and ethnicity groups such as Asian population and White population appear to be statistically significant with $P<0.05$. The results of this study show the possibility of predicting risk factors of population's cardiovascular health through the integration of public health and GIS models.

Topography Changes of the University of Washington Bothell Campus

Safaa Darwish-Elhaji & Mingyou Yang, Bothell Interdisciplinary Arts & Sciences – Environmental Science
sdelhaji@gmail.com

The City of Bothell provided historical topographical data of the University of Washington Bothell (UWB) campus for this group to analyze the changing landscape and elevation of the area. This poster analyzes topographical vector data of the UWB campus for the years 2000, 2008, and 2015. The data were collected by the City of Bothell using Orthoimagery and LiDAR data. Goals for this project included: 1) derive digital elevation models that most accurately represent the UWB campus topography using the Topo-to-Raster technique in an ArcMap environment and 2) compare changes in elevation over time. The intent is to account for the errors that may arise when interpolating three datasets that were collected using two different remote sensing techniques. A map algebra framework is used to compare changes in topography between 2000 and 2015. The campus has had several buildings and a new parking lot added in the time these data were collected, and this group expects to see the most changes in topography where there has been construction. Since the main UWB campus sits on a steep incline, this group expects to see erosion and the effects of compensating for this erosion, as having the most impact in shifting contour lines. Future work on this topic will include comparing vegetation coverage over the years and investigate how they relate to topographic and hydrological changes.

Zoning in Seattle

Lily Wettstein and Katlyn Sawyer, Geography
lilyw4@uw.edu ; sawyer99@uw.edu

This poster discusses the history of multifamily and single family home zoning in Seattle since 1923 when the zoning of the city began. This poster uses historical maps of the city as well as a current map of zoning as it exists today. An analysis is done of family home zoning in Wallingford and Capitol Hill to compare development of two different neighborhoods and how it is connected to zoning policy.