

An aerial photograph of a university campus with green lawns, trees, and several buildings. A large, light-colored starburst graphic is centered on the lawn.

National Center for Smart Growth Progress Report 2012 – 2014

February 2015

Table of Contents

LETTER FROM THE DIRECTOR	5
HIGHLIGHTS OF NCSG ACTIVITIES 2012-2014	7
Education and Outreach	7
Stakeholder Collaboration for a sustainable future	8
Policy-Shaping Studies and Research.....	9
HISTORY AND MISSION	11
NCSG PROJECTS	12
PLCC.....	12
PALS	12
PRESTO	12
SILO	13
Integrated Modeling System for Socio-Economic and Environmental Analysis	14
Technical Assistance for the WMATA Direct Ridership Model	14
Opportunity Mapping and Collaborative	15
ENVIRONMENTAL FINANCE CENTER	15
The Sustainable Maryland Program.....	16
Stormwater Financing and Outreach Unit	17
TRANSPORTATION POLICY RESEARCH GROUP	21
Maryland Statewide Transportation Model (MSTM)	21
NYMTC Truck Model	22
TRIAD Freight Model Framework.....	22
Methods for Modeling Travel Time Reliability	22
Place Type.....	23
Direct Ridership Model (DRM) for MDOT.....	23
Methods for Modeling and Use of the Value of Travel Time Reliability	24
Inclusion of Time-Dependent Networks In MSTM: Proof Of Concept	24
HOUSING POLICY GROUP	25
Planning for Equitable Development in Langley Park, MD	25
Baltimore Regional Housing Plan.....	25
A Picture of Disability and Designated Housing	25
Research Supporting the Neighborhood Stabilization and Homeownership (NSHO) Workgroup	25

Driving to Opportunity	26
PLANNING AND DESIGN CENTER	26
Prince George's County Zoning Code Rewrite	26
Prince George's County Subarea 4 Study	27
Reforming the Planning System in Israel	27
Climate Change Mitigation Analysis, Maryland Department of the Environment.....	27
Scenario/Sketch Planning Tools for Regional Sustainability	27
FHWA Guidebook for Performance Based Scenario Planning.....	27
Statewide Fiscal Impact Analysis, NCSG.....	27
Training Programs and Applications with CommunityViz, Maryland Counties	28
Partnership for Action Learning in Sustainability (PALS), UMD	28
RECENT PUBLICATIONS	29
Uri Avin.....	29
Yuchen Cui.....	30
Casey Dawkins	30
Chengri Ding	32
Fred Ducca.....	32
Sevgi Erdogan	33
Wenbo Fan.....	34
Hiroiyuki Iseki.....	35
Jae Sik Jeon.....	37
Rob Jones	37
Gerrit Knaap.....	39
Chao Liu.....	40
Ting Ma	40
Rolf Moeckel	41
Tim Welch.....	43
NCSG FACULTY, RESEARCHERS AND STAFF	45
Tenured Faculty.....	45
<i>Gerrit Knaap.....</i>	<i>45</i>
<i>Chengri Ding.....</i>	<i>45</i>
<i>Hiroiyuki (Hiro) Iseki.....</i>	<i>46</i>
<i>Casey Dawkins.....</i>	<i>46</i>

Senior Researchers	47
<i>Uri Avin</i>	47
<i>Fred Ducca</i>	47
Associate Researchers	48
<i>Chao Liu</i>	48
<i>Sevgi Erdoğan</i>	48
<i>Rolf Moeckel</i>	49
Visiting Researchers	49
<i>Wenbo Fan</i>	49
<i>Harutyun Shahumyan</i>	50
Staff	50
<i>Jason Sartori</i>	50
<i>Kim Ross</i>	51
<i>Emily Tettelbaum</i>	51
<i>Jennifer Wise</i>	51
<i>Matt Johnson</i>	51
Ph.D. Students	52
<i>Eli Knaap</i>	52
<i>Ting Ma</i>	52
<i>Jae Sik Jeon</i>	52
<i>Rob Jones</i>	52
<i>Yuchen Cui</i>	53
<i>Tim Welch</i>	53
EFC Staff	53
<i>Lauralee Barbaria</i>	53
<i>Monica Billig</i>	54
<i>Medessa S. Burian</i>	54
<i>Jennifer Cotting</i>	54
<i>Sarah Diefendorf</i>	55
<i>Mike Hunninghake</i>	55
<i>Jill Jefferson</i>	55
<i>Brent McCloskey</i>	56
<i>Dan Nees</i>	56

Eric Reed..... 56

Joanne Throwe..... 57

Sean Williamson..... 57

Administrative Staff..... 57

Cynthia Williams..... 57

Toni Ames 57

Alyson D’Apice..... 58

LETTER FROM THE DIRECTOR

Dear Reader,

Thank you for taking time to read the progress report of the National Center for Smart Growth Research and Education. As I write this in January, 2015, the Center is beginning its 15th year of operation, its 13th since I joined the Center in 2002. As always, these progress reports document consistency and change.

Our mission of conducting research and offering educational programs on topics that pertain to smart growth has not changed, but staff and areas of focus have changed, though not very much. We still have four faculty with joint appointments in the Urban Studies and Planning program, approximately 20 full-time professional staff and three administrative staff. Major changes in staff include: Uri Avin, former planning director for Howard County with years of experience as a planning consultant, who heads our Planning and Design Center; Rolf Moeckel, formerly a transportation modeler for Parsons-Brinkerhoff, now plays a major role in the Transportation Research Group; Kim Ross, former executive director of the Center for Integrative Environmental Research, now leads the Purple Line Corridor Coalition; and Daniel Engleberg, a former Urban Studies and Planning Student, now staffs our PRESTO project.

The Environmental Finance Center (EFC) has also expanded rapidly and added staff. The EFC has officially partnered with the Environmental Finance Center West located in the San Francisco Bay Area in California. This partnership will expand and strengthen EFC's services on both coasts of the United States. EFC West staff include: Sarah Diefiendorf who has over 20 years of experience in the environmental field, including work in developing countries and with American Indian tribes, to promote green economies and renewable energy; and Lauralee Barbaria who has over 25 years of experience in the financial, hi-tech and health care industries. Additionally, the EFC has hired Naomi Standing, an economist with 15 years of experience addressing issues of the environment, sustainability and water in the United States and the Asia-Pacific region through initiatives built on market and incentive principles.

With some variation, and depending what is counted, we still generate approximately \$4 million per year in grants and contracts, publish 15-20 articles per year in peer-refereed journals and, of course, produce numerous reports, working papers, and conference presentations.

We still have four subunits, although the Planning and Design Center has replaced the Center for the Use of Sustainable Practices:

- The Environmental Finance Center, one of nine EFCs funded by EPA and headed by Joanne Throwe, continues to help local governments find innovative ways to finance environmental preservation. One of its current focus areas is the Sustainable Maryland Certified Program for Maryland Municipalities.
- The Transportation Policy Research Group, headed by Fred Ducca and cosponsored by the Maryland Department of Transportation, has built and maintains the Maryland State Transportation Model, loosely coupled econometric, land use, nutrient loading, and fiscal impact models.

- The Planning and Design Center, led by Uri Avin, was created to work closely with state, regional, and local government on issues of planning and sustainable development.
- The Housing Strategies Group, headed by Casey Dawkins, leads our efforts in housing research and education, including the topics of housing affordability, matching housing with employment opportunities, expanding housing choices, and equitable development.

At its core, the NCSG strives to create a more sustainable, vibrant and enhanced quality of life for communities across the globe. Since its establishment, the NCSG has worked to advance the notion that research, collaboration, engagement and thoughtful policy development hold the key to a smarter and more sustainable approach to urban and regional development. This is no more evident than in the projects the Center has spearheaded over the past three years. In the following pages are some of the highlights of the Center's work in furthering this mission.

Again, thank you for taking time to read our progress report; I hope you find something helpful or informative. All of us at the Center welcome your feedback and hope you will contact us if you need more information. Without such dialog between the Center and its external constituencies we cannot succeed at facilitating a smarter and more sustainable approach to urban and regional growth.

Sincerely,

Gerrit Knaap
Director

HIGHLIGHTS OF NCSG ACTIVITIES 2012-2014

Education and Outreach

In the fall of 2013, we initiated the **Partnership for Action Learning in Sustainability (PALS)**, a first for the University of Maryland and one of the largest program of its kind in the country. Developed collaboratively with local planners and interagency staff, PALS will blend student ingenuity, classroom concepts and faculty expertise to help Maryland communities become leaders in sustainable practices. Customized coursework targets the goals and projects articulated by the partner municipality, engaging students directly with the community on real projects. The inaugural partner city, Frederick, Maryland, will benefit from 30 customized courses from 10 UMD colleges and programs over the 2014-15 academic year. Over 50,000 student and faculty hours will be dedicated to the City of Frederick, an estimated value of over three million dollars.

The NCSG continues to offer the **GIS High School Internship**, a program designed to help local high school students jumpstart a rewarding post-graduation career path by teaching them Geographic Information Systems. Since its inception in 2012, the program has paired students with several research projects at the center, launching its first community-based project with the City of College Park this past summer.

In November of 2012, we began webcasting our “**brown bag**” seminars via our website, bringing smart growth experts, compelling studies and practical planning tools to a wider audience in a readily accessible way. We have broadcasted some 20 seminars since the program’s inception, attracting planners and stakeholders from all over the country. Many of these have provided AICP credits.

The **Local Government Stormwater Financing Manual**, released by the EFC in January 2014, offers local governments the framework for defining and establishing their own stormwater management program. The Manual addresses areas such as: reducing cost through the use of performance based financing; establishing effective stormwater rebate and credit programs; using markets and offsets in an urban environment; and maximizing stormwater benefits through the use of green infrastructure practices.

The EFC also launched the **Green Infrastructure Financing Map** in early fall of 2014 highlighting green infrastructure financing stories from diverse communities across the country showcased in an interesting and accessible way. The EFC has developed this interactive map that uses infographics to share the stories of 20 communities from across the country that represent a diverse collection of sizes, geographies, resource protection drivers, and financing approaches. In fall 2014, the EFC launched **Environmental Financing Boot Camps** geared toward offering local governments an intense one- to two-day workshop on financing a multitude of environmental initiatives such as stormwater, green infrastructure and sustainability initiatives, just to name a few. The Boot Camps have been very popular as they offer valuable financing information in a shortened time frame at a reduced cost.

Launched by the EFC in fall of 2014, and in partnership with the Low Impact Development Center (LIDC), the **Municipal Online Stormwater Training (MOST) Center** will help communities bridge the gap in needed technical and financial resources through a comprehensive training program to help municipalities within the Chesapeake Bay Watershed access and implement innovative stormwater management techniques to improve water quality in the Bay.

In January 2014, under a grant from the National Fish and Wildlife Foundation, the **Climate Change Mitigation and Adaptation Program** of EFC released a report on its work with the coastal community of Oxford, MD, to integrate sea level rise projections into recommendations for financing and managing the town's stormwater program. The chief recommendation from the study was the adoption of a local stormwater and shoreline protection financing mechanism to raise revenue necessary to invest in water management infrastructure.

Stakeholder Collaboration for a sustainable future

In 2013, we launched a new initiative to address community development issues along the Purple Line corridor, a 16-mile, multi-million dollar light rail line that will link multiple communities within Montgomery and Prince George's County. In partnership with a consortium of community organizations, private groups, local government and other university programs, we formed the **Purple Line Corridor Coalition (PLCC)**. Comprising over 20 special interest groups and government entities and sponsored by a variety of public/private organizations, the PLCC provides a platform for collaboration, idea exchange and conflict resolution, as well as access to key research, tools and case studies, ensuring that the MTA's investment creates vibrant neighborhoods while preserving existing community assets. The PLCC hosted an inaugural regional workshop, in March 2014, the first Purple Line-related event of its kind in the Washington region and the largest assembly of community stakeholders (over 250) since the announcement of the proposed light rail. Since then we have hosted two additional workshops, one in Silver Spring and one in Hyattsville to engage the public in the drafting a Purple Line Community Compact.

In October 2013, we co-hosted an international **symposium on planning at the state and nation-state level** at the University College, Dublin, with participation from the Maryland Sustainable Growth Commission, the Maryland Secretary of Planning, the Maryland Department of Transportation's Office of Planning and Capital Programs, as well as representatives from five states and five European nations.

In April, we once again collaborated with the Montgomery County Department of Planning for **Makeover Montgomery 2 – Moving Forward Montgomery**. The two-day symposium brought nearly 300 design and development professionals, academics, students and citizens together with some of the nation's brightest minds in planning, design, economics and development to discuss examples and strategies for shaping the future of Montgomery County.

We also organized and co-hosted the first **Local Government Exchange** in central Maryland with the Maryland APA Chapter in June 2014. This event attracted 100 planners, economic

development officials and private sector stakeholders from the Baltimore-Washington region to share successes, failures and lessons learned across a host of planning topics and initiatives.

Sustainable Maryland Certified (SMC) is an initiative of the Environmental Finance Center designed to support Maryland's 157 municipalities as they look for cost-effective and strategic ways to protect their natural assets and revitalize their communities. Using best practices in resource areas like water, energy, planning, health, food, and economy, a municipality can earn points toward sustainability certification. In 2014, 10 municipalities were certified, bringing the total of certified communities in the program to 22.

The Environmental Finance Center has assisted the Maryland Energy Administration and Maryland communities since 2013 through its work on the **Maryland Smart Energy Communities (MSEC)** program. This grant-based, policy-driven program challenges local governments to adopt energy policies related to energy efficiency, renewable energy, and transportation petroleum reduction while simultaneously instituting energy best practices. At the end of 2014, seven county governments, Baltimore City and 40 Maryland municipalities are currently participating in the program. EFC's responsibility is to recruit, educate and assist communities as they meet program deliverables in energy tracking, planning, policy development and grant management.

Policy-Shaping Studies and Research

We have conducted extensive research studies for jurisdictions throughout the region to help inform their efforts to foster sustainable development. The **Plan for Regional Sustainability Tomorrow (PRESTO)**, which launched this past spring, is a multi-year project for the Baltimore-Washington region that will model and develop scenarios for greater social, environmental and economic sustainability, identifying policies that can implement these sustainable practices.

The STAR project, which completed this year, created a framework for economic development in Western Maryland. The three-year project bridged information gleaned from current trends in the region with public workshops and community input to identify needs and opportunities for sustainable economic development in the region.

Significant work was also accomplished as part of the NCSG's **Sustainable Equitable Economic Development**—or SEED—initiative, a three-year initiative that aimed to eliminate obstacles faced by low income and underserved populations while simultaneously promoting environmental sustainability. Funded by a \$400,000 grant from the Surdna foundation, the NCSG launched the SEED initiative in partnership with the Maryland Department of Planning and a coalition of Maryland-based non-profit organizations. The initiative's central mission is to identify opportunities for growth through in-depth economic, social and environmental analysis, and to guide community and government partnerships in their efforts to create more sustainable and equitable economic development throughout the state.

Building on this kind of work, the Center also assisted the Baltimore Metropolitan Council in its **Opportunity Collaborative** plan for the region, directed at bridging housing, workforce

development and transportation strategies. The Center's **Opportunity Mapping** tool, a product of this effort, allows citizens to assess residential locations by their relative access to opportunities, which the user can define. Our opportunity mapping work will play a key role in the Opportunity Collaborative's Regional Sustainable Communities Plan to be released in 2015.

Finally, the Transportation Policy Research Group of the NCSG continues to work in collaboration with MDOT and its sister agencies on a variety of **transportation and transportation-related research projects**. Many involve the exercise of the Maryland State Transportation Model—that was built by NCSG and now a key element of the state's planning tools—but other projects involve place typing, indicator analysis, freight analysis and land use modeling.

Started in fall 2014, the **Chesapeake Trust Fund Financing Task Force** is a collaboration between the Environmental Finance Center and the Center for Social Value Creation, located at the Robert H. Smith School of Business. The two centers will develop a detailed business plan for establishing a new public-private financing institution in support of the Chesapeake Bay restoration and protection effort. In conjunction with the Task Force, The Environmental Finance Center's **Integrated Public-Private Financing Initiative** is working to expand the scale of water quality and environmental restoration activities in iconic watersheds across the country, including the Chesapeake Bay, Puget Sound, Narragansett Bay and the Delaware River Basin with an overarching vision to establish public-private environmental financing institutions and partnerships, capitalized with pooled investments supporting a variety of restoration and protection opportunities.

The Environmental Finance Center is also developing a **Maryland Chesapeake Restoration Financing Strategy** in response to the Maryland General Assembly's request for an assessment of the resources necessary for achieving Bay restoration success. The objective of this project is to provide Maryland State officials with a strategy for financing its responsibilities associated with the Chesapeake Bay restoration effort.

HISTORY AND MISSION

The National Center for Smart Growth Research and Education (NCSG) was established in 2000 as a direct result of the rapidly expanding national and international interest in improving land-use management through efforts collectively known by the term “Smart Growth.” The NCSG was created at least in part due to the national reputation of the State of Maryland’s 1997 Smart Growth and Neighborhood Conservation Program and a desire by the University of Maryland to build on the national and international visibility work on these interwoven issues directly affects the nature of communities, the landscape and environment and ultimately, the state’s quality of life.

From the outset, the NCSG was envisioned as an institution that would assess and assist the implementation of the Maryland Smart Growth initiative and one which would become a national resource for research and education on Smart Growth and related land-use issues and strategies.

The NCSG is a cooperative venture of four schools on the University of Maryland’s, College Park campus; Agriculture and Natural Resources; Architecture, Planning and Preservation; Engineering and Public Policy. NCSG brings the diverse resources of the University of Maryland and a network of national experts to bear on issues of land development, resource preservation and urban growth through inter-disciplinary research, public outreach and education. This approach recognizes that work on these interwoven issues directly affects the nature of communities, the landscape and environment and ultimately, the state’s quality of life.

The National Center for Smart Growth is impacting communities across the nation on issues related to the environment, transportation, public health, land-use, housing and community development, and international urban development by implementing an array of projects and programs that utilize an objective and multidisciplinary approach.

NCSG’s mission translates into two fundamental goals:

1. To fill the critical gaps in the research and available data related to the underlying assumptions and effects of “Smart Growth” including the effectiveness of state and local growth management initiatives.
2. To fill an equally critical gap in available education and training for decision-makers who need new ideas and tools for adopting cross-disciplinary and integrated approaches to managing growth, land-use planning, problem-solving and implementation.

NCSG PROJECTS

Although The National Center for Smart Growth (NCSG) provides administrative support for each of its subunits, it also leads in several research and service projects

PLCC

The Purple Line Corridor Coalition (PLCC), administered by the National Center for Smart Growth at the University of Maryland, brings a regional corridor approach to suburban Maryland's upcoming light rail project, the Purple Line. The Purple Line Corridor Coalition engages organizations active in the planned light rail corridor, facilitates collaboration and integration, and conducts and disseminates research to assure that investments in the Purple Line achieve the maximum possible economic, social, and environmental benefits to its neighborhoods, residents and businesses.

PLCC works in close collaboration with the Maryland Transit Administration, Montgomery and Prince George's Counties, nonprofit organizations, local and regional developers and businesses throughout the corridor to complement their ongoing work. In August 2014, the US Environmental Protection Agency (EPA) selected the PLCC to deliver the task order for Planning for Equitable Development along the Purple Line. This task order will help the PLCC understand how to stimulate sustainable and equitable economic development throughout the corridor without displacing affordable housing or small businesses. The PLCC is also embarked on facilitating a "compact" between ethnic/minority interest groups and local government around employment commitments for such groups as the Purple Line's economic opportunities emerge.

PALS

The Partnership for Action Learning in Sustainability (PALS) at the University of Maryland (UMD) is a new, campus-wide initiative that enlists faculty expertise and student ingenuity to offer fresh solutions to challenges facing Maryland communities. Administered by the National Center for Smart Growth (NCSG) at UMD, the PALS mission is to provide high-quality, low-cost assistance to local governments while creating an active and valuable real-world learning experience for UMD graduate and undergraduate students.

Targeted, customized coursework, created by faculty across a wide range of disciplines, captures the partner community's specific issues. The results are innovative ideas and solutions to help Maryland communities secure a more economically, environmentally and socially sustainable future. For the 2014-2015 academic year, PALS has joined forces with Frederick, Maryland to build on the City's sustainability efforts. Thirty courses drawn from ten schools, colleges and programs across the UMD College Park campus will focus over 50,000 student hours on helping build a more sustainable city. PALS is funded by a combination of a grant from the Provost and fees per course from the local participating government. The next jurisdiction will be selected via an RFP process in early 2015.

PRESTO

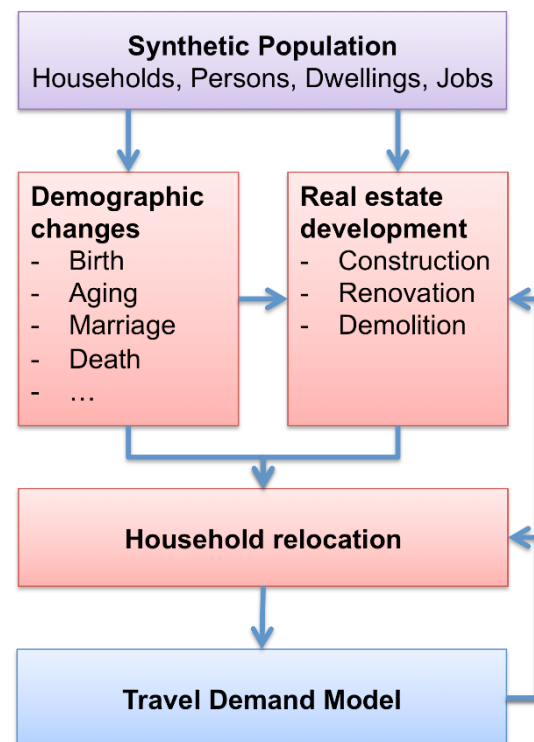
The Plan for Regional Sustainability Tomorrow (PRESTO) a new project to develop, disseminate, and promote the implementation of a sustainable development strategy for the Baltimore-Washington region, in conjunction with the Town Creek Foundation and other stakeholders in the region. Well known examples of similar efforts include privately financed

and promoted plans such as the Burnham plan for Chicago, the Wallace-McHarg plan for the Valleys, and the series of plans for greater metropolitan New York prepared by the Regional Planning Association. These plans or strategies were not prepared for or adopted by any public agency but were highly influential for decades after they were released.

The primary goal for the 2014-15 school year is to stimulate a science-based conversation about sustainability in this region and to develop one or more baseline scenarios. Stakeholders will stimulate the dialog by considering key driving forces that will shape the future of the region and by deploying a highly developed set of data and analytic tools to develop baseline scenarios.

SILO

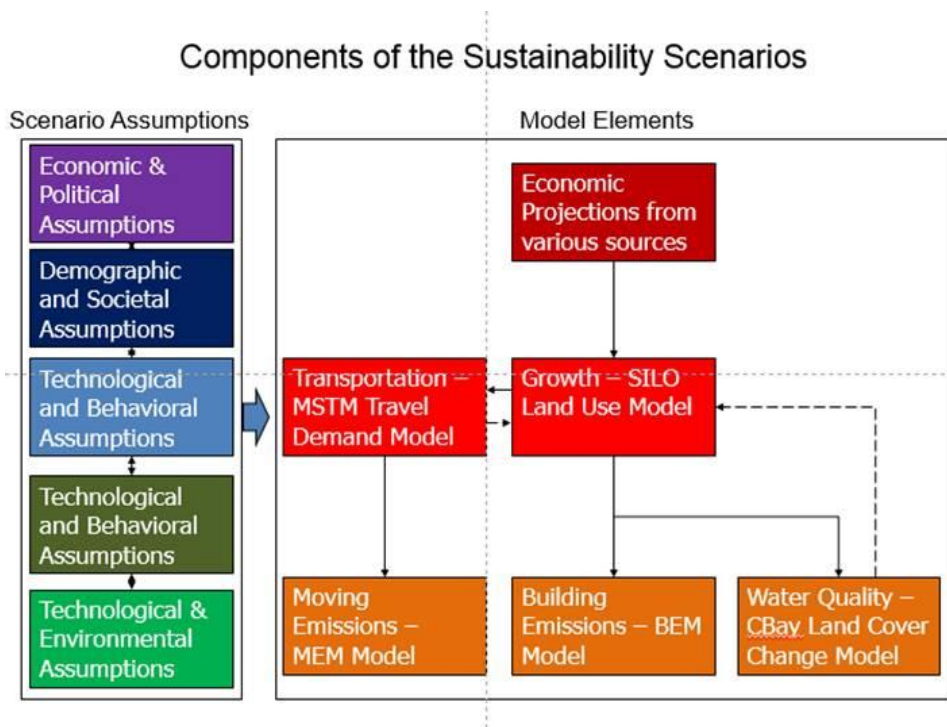
The Simple Integrated Land-Use Orchestrator (SILO) was originally developed for Minneapolis/St. Paul and is currently implemented for the Maryland Statewide Transportation Model (MSTM) study area. SILO is designed as a discrete choice microsimulation model. Discrete choice means that decisions (such as a decision of a household to move to a new dwelling) are modeled explicitly based on utilities at the current dwelling location and expected utilities at alternative dwelling locations. Being a microsimulation model, every household and person is simulated individually. SILO models household relocation, non-spatial demographic changes (such as birth, aging, marriage or having children), developers' decisions to build new residential buildings, and changes to dwellings over time (including renovation, deterioration and demolition). The SILO website (www.silo.zone) provides further information.



SILO is used in three projects at NCSG. For the Maryland Department of Transportation (MDOT), SILO was integrated with the MSTM transportation model to fully represent the land-use/transport feedback cycle. The impact of transit-oriented development (TOD) will be analyzed for MDOT. For the Plan for Regional Sustainability Tomorrow (PRESTO) project funded by the Towncreek Foundation, SILO and MSTM are further integrated with environmental impact models and a land cover model. The goal of the PRESTO project is to investigate sustainable policies for the Baltimore/Washington region. Thirdly, SILO is used in the SESYNC project, which expands the PRESTO integration by a climate change model.

Integrated Modeling System for Socio-Economic and Environmental Analysis

Funded by the NSF Institution SESYNC (National Socio-Environmental Synthesis Center), NCSG is building a large scale integrated model that includes the transportation model MSTM, the land-use model SILO, environmental impact models BEM and MEM developed previously at



NCSG, the land-cover model CBLCM of the Chesapeake Bay Program and ESSIC's climate change model. The goal of this project is to analyze policies that promotes sustainable development, with a particular focus on environmental impacts, impacts on society and the health of the Chesapeake Bay.

Technical Assistance for the WMATA Direct Ridership Model

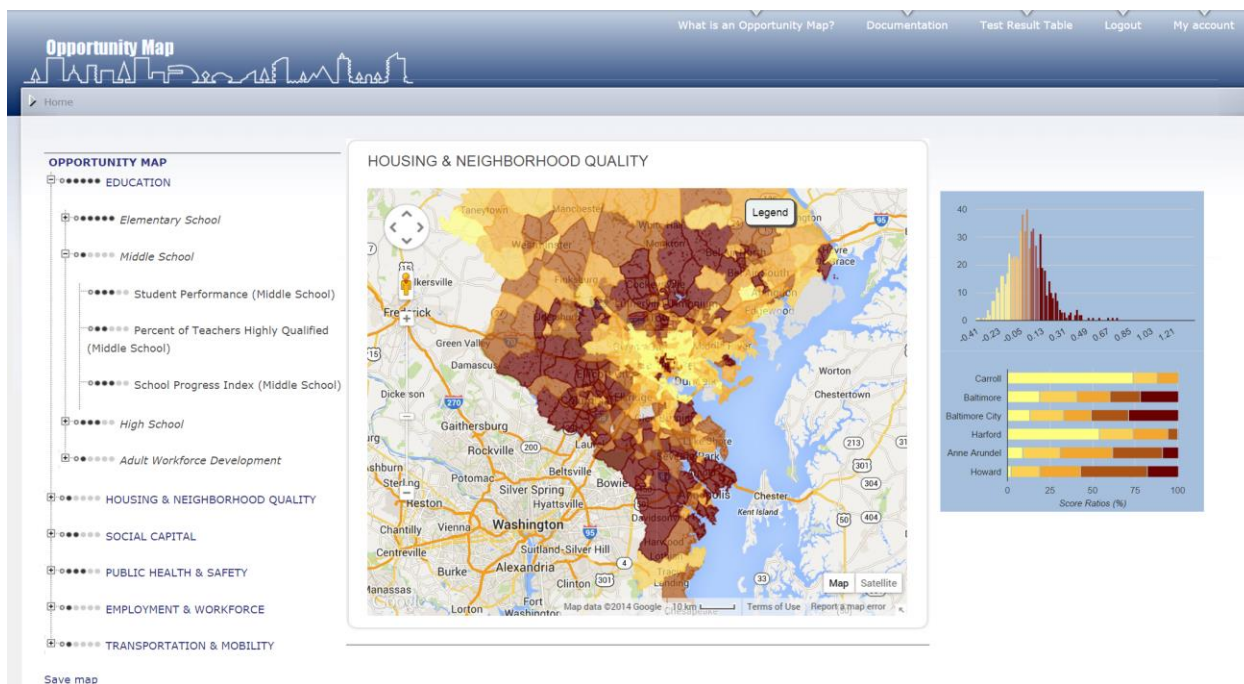
The Washington Metropolitan Area Transit Authority (WMATA) had an urgent task to develop regression-based ridership models to predict a change in ridership with assumptions of land use and demographic changes around the Metro station areas. Given its expertise and past experience, the NCSG worked to extend the current set of variables and statistical models that WMATA has developed by May 2014, providing technical assistance particularly for the regression-based ridership models of the peak time periods.

NCSG's technical assistance included: (1) providing a set of variables related to the built environment, street connectivity, and transit system connectivity that WMATA does not currently have, (2) conducting data processing and pre-regression analysis, (3) assisting in regression analysis to examine the effects of key variables in WMATA's particular interest on Metro train ridership and predict Metro ridership for a used unit of analysis, (4) conducting post-regression analysis to validate the results for the use of ridership predict, and (5) assisting in ridership prediction for a change in the number of households in a station surrounding area based on the regression models obtained.

Opportunity Mapping and Collaborative

Funded by a Regional Sustainable Community Planning grant from the U.S. Department of Housing and Urban Development to the Opportunity Collaborative, the NCSG created maps to analyze disparities in opportunity across the Baltimore region. The NCSG worked with an advisory group of subject matter experts from across the region to develop 92 quality of life indicators in six categories: Education; Housing and Neighborhood Quality; Social Capital; Public Health and Safety; Employment and Workforce; and, Transportation and Mobility. After standardizing, weighting, and aggregating the indicators, the NCSG team produced six category index maps and one composite opportunity map. The maps have since been used to develop a housing plan for the region, but can also be used by local governments to determine how to best allocate resources and invest in communities.

Following the success of the Baltimore mapping effort, the NCSG has partnered with Facet Decision Systems to create an interactive online opportunity mapping tool for the entire state of Maryland. The system will allow users to weight categories, subcategories, and individual indicators to create, map and analyze opportunity indexes. When completed, the mapping tool can be used to explore how geographic variation in access to opportunity impacts different demographic groups and interacts with other public policies, such as economic development strategies or workforce development programs. A beta version of the tool can be found at <http://oppmap.facet.com>.



ENVIRONMENTAL FINANCE CENTER

The Environmental Finance Center (EFC) is one of nine university-based centers across the country established by the U.S. Environmental Protection Agency in 1992. These centers help create innovative financing solutions that assist communities with managing the costs associated with environmental protection and improvement.

The EFC is in its seventh year since merging with the NCSG and continues to expand the NCSG's capacity beyond land-use research and education. Under the direction of Joanne Throwe, the EFC provides technical assistance as well as training and public outreach, typically in the form of workshops, charrettes and conferences, designed to promote the more effective management of the costs associated with resource protection activities.

The Sustainable Maryland Program

Sustainable Maryland (SM) is an initiative of the EFC designed to support Maryland's 157 municipalities as they look for cost-effective and strategic ways to protect their natural assets and revitalize their communities. This free and voluntary program helps communities choose a direction for their sustainability efforts, complete their chosen actions with help from program tools and be recognized for their accomplishments through a certification process.

SM opened to municipalities in June 2011 at the Maryland Municipal League Convention with the launch of its website, www.sustainablemaryland.com. The Town of Berlin, Maryland was the first municipality certified under the program in April 2012. Currently, the program boasts 48 registered communities, or approximately 30% of the municipalities in the state, 22 of which have been awarded certification.

In the coming year, SMC will focus on supporting the Green Teams of existing communities, engaging additional communities, expanding the menu of actions to keep participating communities moving forward, considering the viability of scaling the program up to the county level, and diversifying the programs financing strategy.

Green and Healthy Schools

With support from the U.S. Environmental Protection Agency's (EPA) Office of Environmental Innovation, the EFC conducted a scoping study to investigate the numerous state, regional, and local environmental health-related opportunities currently available to K-12 schools in Region 3. The EFC created organized inventories of the policies, programs, tools, and other resources supporting green and healthy schools and also conducted an analysis to identify potential areas of improvement.

As a result of this work, stakeholders from each state and the District of Columbia now have a clearer picture of the environmental health related resources available to schools to assist them in becoming green and healthy. In addition, Region 3 jurisdictions and the EPA received recommendations for expanding existing efforts and improving the delivery of green and healthy school information around the region. Finally, Green Ribbon Schools' (GRS) coordinators will have lessons learned from other Region 3 GRS programs.

With additional support from EPA's Office of Environmental Innovation, the EFC also implemented Phase II of the project which involved working with the Region 3 Green and Healthy Schools Coordinator to plan and facilitate state meetings to discuss current policies/programs/resources and to identify strategies to create more robust, coordinated state environmental health school programs.

Stormwater Financing and Outreach Unit

Effectively managing stormwater is one of the greatest challenges faced by communities through-out the Mid-Atlantic region. Like all infrastructure, stormwater management systems are expensive to implement and maintain. In response to the dilemma, the Stormwater Financing and Outreach Unit was created to address stormwater financing questions and help craft strategies that best meet local needs.

The Stormwater Unit often provides several services to assist communities including: an assessment of existing stormwater management activities, research and analysis on financing options, consultation with municipal or county staff and assistance with outreach and education activities.

Past and current projects include assessing current stormwater management programs; evaluating the existing program structure, including an evaluation of current capacity and funding levels; identifying gaps in the existing program and evaluate future needs; and determining the appropriate level of service and revenue needed to sustain a comprehensive municipal stormwater program. These stormwater feasibility studies and financing strategy recommendations include:

- Ocean City, MD: Stormwater Feasibility Study and Outreach Strategy
- Berlin, MD: Stormwater Feasibility Study and Outreach Strategy
- Salisbury, MD: Stormwater Feasibility Study and Outreach Strategy
- Oxford, MD: Stormwater Feasibility Study and Outreach Strategy
- Bowie, MD: Stormwater Feasibility Study and Outreach Strategy
- Federalsburg, MD: Stormwater Infrastructure Plan and Green Infrastructure Plan
- College Park, MD: Stormwater Feasibility Plan and Cost Analysis
- Anne Arundel County, MD: Economic Impact Assessment
- Baltimore County, MD: Economic Impact Assessment
- Washington, DC: Economic Impact Assessment
- Lynchburg, VA: Economic Impact Assessment
- Shenandoah Valley, VA: Capacity analysis, cost estimate, and outreach strategy
- Hampton, VA: Green Infrastructure and public private partnership
- Lancaster County, PA: Regional authority
- Blair County, PA: Green infrastructure and stormwater financing support and outreach
- Warrington, PA: Green infrastructure investment and land use planning
- Scranton, PA: Stormwater Authority and asset management
- Berkeley County, WV: Stormwater financing and outreach strategy
- West Virginia: Asset management and leadership training for stormwater and source water protection
- Mid-Atlantic: Local Government Stormwater Financing Manual
- Memphis and Shelby County, Tennessee: Green Infrastructure Financing Guidance Manual and Workshop

Air Quality Programming

The Mid-Atlantic Regional Dray Truck Emission Reduction Program

The EFC completed its third year of partnering with the Mid-Atlantic Regional Air Management Association (MARAMA) to implement the MidAtlantic Regional Dray Truck Emission Reduction

Program. The program provides an award of up to \$20,000 to replace older dray vehicles with more emission-efficient engines with the goal of reducing air pollution and greenhouse gases associated with the transport of goods to and from the Ports of Virginia, Baltimore, Philadelphia and Wilmington, Delaware. The EFC created a financial strategy and provided project management services including application management, stakeholder engagement and coordination, and report writing.

Energy Programming

Higher Education Greenhouse Gas Management

The EFC worked with Towson University, the Universities at Shady Grove (a University System of Maryland Regional Education Center), and the University of Maryland, University College to assist with greenhouse gas (GHG) inventories, analysis, and sustainability communication. With funding from the respective institutions, the EFC has leveraged its energy and GHG mitigation experience to coordinate data holders, assemble a quantitative and qualitative analysis, and communicate results.

As a result of the work, these institutions are better able to assess their carbon footprint and prioritize strategies for mitigating emissions. In all cases, the EFC's assistance helps these institutions meet their commitments under the American Colleges and Universities President's Climate Commitment.

Maryland Smart Energy Communities

The EFC has been working closely with the Maryland Energy Administration to launch and implement the Maryland Smart Energy Communities (MSEC) program, a grant-based initiative designed to support counties and municipalities in their energy-related projects. Once communities adopt policy goals related to energy efficiency, renewable energy, or transportation petroleum reduction, and complete complementary work such as energy baselines and an action plan for achieving goals, they are eligible to receive pilot project implementation dollars. More than 35 Maryland communities are currently involved in the program.

Agricultural Programming

Manure-to-Energy

For three years EFC has been contributing to a multi-organizational Manure-to-Energy Initiative that aims to improve water quality in nutrient hot spots and create new revenue streams for small farmers in the Chesapeake Bay Watershed. The Manure-to-Energy initiative includes the installation of several demonstrational pilot technologies that convert poultry litter to on-farm heat and electricity while reducing land application of manure.

Examining the Efficiency of Agricultural Practices in the Pocomoke Watershed

This two-year project focuses on agricultural best management practices (BMPs) in Maryland's Pocomoke River watershed. In partnership with The Nature Conservancy (TNC), this effort is designed to assess the effectiveness of a new BMP evaluation tool developed by TNC. The EFC's role is to assess implementation costs of structural practices in the Pocomoke watershed, and to make recommendations for reducing those costs over time.

Program and Policy Analysis

Developing Performance-Based Financing Programs in Maryland

The EFC has been working with the Maryland Department of Natural Resources (DNR) on innovative ways to maximize the capacity, efficiency, and effectiveness of the state's water quality financing programs. Specifically, the EFC has been working with DNR on expanding the impact of the Chesapeake and Atlantic Coastal Bays Trust Fund, which is an innovative resource for financing water quality restoration activities across the state.

The Economic Impacts of Green Infrastructure in the District of Columbia

The EFC worked with the District of Columbia Department of the Environment (DDOE) to conduct an economic and fiscal assessment of the impacts associated with managing stormwater through low impact development (LID). The EFC customized existing models and valuation tools - specifically the IMPLAN model - to improve financing processes and decision-making within the District.

Promoting the Viability of Working Waterfronts in Maryland

The EFC is working with the Maryland Department of Natural Resources (DNR) to provide Maryland state leaders with a strategy for financing efforts to revitalize working waterfront communities throughout the state. Focusing specifically on the commercial fishing industry, the EFC provided DNR's Chesapeake and Coastal Service with a framework for incentivizing investment and funding into processes that could lead to industry development including increased access to infrastructure and public education and outreach. This year, the EFC is working specifically with the City of Cambridge to implement some of these ideas as a pilot.

Supporting the National and Urban Community Forestry Council

The EFC was asked by the National and Urban Community Forestry Advisory Council (NUCFAC) to conduct an assessment of federal programming designed to support green infrastructure efforts from the perspective of both the agencies involved and the stakeholders attempting to make use of these programs. The EFC examined the numerous federal green infrastructure programs and provided recommendations for ways to improve the efficiency of these investments and to ensure that federal support is catalytic in drawing in additional public and private capital to on-the-ground green infrastructure efforts.

In a follow up effort with NUCFAC, the EFC is working with a team of universities, including the University of Virginia's Institute for Environmental Negotiation and the University of Washington, to help develop the next NUCFAC Ten Year Action Plan that will guide the Forest Service's urban and community forestry activities and investments.

Recreational Boating and Fishing Fiscal Analysis

The EFC conducted a detailed analysis of proposed legislative and policy decisions aimed at revitalizing Maryland's boating industry and maintaining adequate resources for its Waterway Improvement Fund (WIF). Specifically, the Maryland Department of Natural Resources (DNR) asked the EFC to estimate the probable impacts of changing the reach and scale of the state's vessel excise tax, as well as extending fees to non-motorized boats. The department also asked EFC to assess the effect that a cap on the excise tax might have on the number of boats registered in Maryland and the number of boats bought or sold in Maryland, as well as impacts

to dedicated and general fiscal revenues and demand for WIF resources. The final report, which was presented to DNR and elected officials earlier this year allowed for state leadership to make more informed decisions on the matter that better serve the goals of the state and its residents.

Technical Assistance

Watershed Implementation Plan Financing Forums

Jurisdictions in the Chesapeake Bay watershed have been tasked with developing Watershed Implementation Plans that outline how they will meet nutrient load reduction allocations assigned to them as a part of the Bay TMDL. This is proving a daunting task for communities struggling with shrinking budgets and capacity that is already spread thin across numerous competing local priorities. Through a cooperative agreement with the U.S. EPA Chesapeake Bay Program Office, the EFC is working to help communities address this challenge by offering a series of Financing Forums around the watershed designed to connect communities with the information and resources they need to efficiently and effectively implement local water quality priorities.

Assisting the recipients of Sustainable Communities Partnership Grants

The EFC is a member of a team delivering capacity building technical assistance to recipients of HUD-EPA-DOT Sustainable Community Partnership Grants. The assistance focuses on water resource management and green infrastructure needs and has taken the form of national webinars that serve broad audiences, largescale workshops that address regional issues, community-specific “office hours” sessions that offer more targeted assistance, and development of a clearing house of additional outside resources as a one-stop-shop for information and tools. Most recently this included a green infrastructure financing “boot camp” for the City of Memphis, Tennessee, the surrounding county, and a number of neighboring municipalities.

Smart Management for Small Water Systems

The EFC Network is collaborating on a grant funded by the EPA to provide managerial and financial training to small drinking water systems across the country, led by the University of North Carolina EFC and the Southwest EFC. The goal of the project is to improve the financial decision making and organizational capacity of small, public drinking water systems in all 50 states and US territories. Each regional EFC is responsible for meeting with each state agency’s drinking water office in its region, organizing and hosting a training in each state, and organizing a regional leadership training. The UMD EFC was responsible for the trainings in all Region 3 states.

Supporting the needs of NFWF technical assistance awardees

Through a partnership formed with the National Fish and Wildlife Foundation (NFWF), the EFC has taken on a key role in providing technical support and direct assistance as a part of NFWF’s Local Government Capacity Building Initiative. The EFC assisted with managing the assistance received by ten local governments attempting to overcome significant challenges that have been identified as barriers to improving water quality. The EFC is managing the technical assistance delivery process and is the direct technical assistance provider for communities where a financing strategy is involved.

Revitalizing Johnston Run

In Mercersburg, Pennsylvania, the EFC provided technical assistance to a small nonprofit using a green infrastructure approach to improving the conditions of Johnston Run, a tributary to the Conococheague. The goal of the project partners is to restore Johnston Run as a “living waterway” using a holistic approach that not only improves water quality, but also addresses other community needs related to public health, recreation, and the local economy. The EFC's assistance focused on capacity development for the organization, help with outreach to local stakeholders, and financing strategy development for a trails project designed to link local resources, provide access to recreational activities, and reconnect the community with one another and the Run.

Developing Strategies to Lower Watershed Restoration Costs in Calvert County, Maryland

The EFC partnered with Main Street Economics to develop a comprehensive strategy for reducing the costs of watershed restoration in Calvert County, Maryland. Through the support of the National Fish and Wildlife Foundation, the EFC developed a strategy to improve the capacity of Calvert County to implement water quality restoration and protection projects and practices through the use of more flexible and sustainable financing processes.

TRANSPORTATION POLICY RESEARCH GROUP

The Transportation Policy Research Group (TPRG) is a joint effort between the University of Maryland and the Maryland Department of Transportation. The TPRG explores new approaches to transportation policies and planning that provide citizens with choices which increase mobility, increase accessibility, improve the environment and promote sound urban development and redevelopment. Under the guidance of Dr. Frederick Ducca, the TPRG continues to apply research and implement programs to provide better understanding of the interactions between transportation, land use and the environment.

During the last year the TPRG has provided a wide range of technical support to the Maryland Department of Transportation on multiple issues including freight analyses, Transportation oriented development, and accessibility mapping. In addition the TPRG has supported the Maryland State Highway Administration in improving statewide travel forecasting procedures and helping the Maryland Department of the Environment analyze the relation between transportation projects and Greenhouse Gas Emissions.

Maryland Statewide Transportation Model (MSTM)

The Maryland Statewide Transportation Model (MSTM) is an advanced “four step”, trip-based model that covers the State of Maryland plus surrounding areas at the statewide layer and the remainder of North America at the national layer. Since 2006, the Maryland State Highway Administration (SHA) has developed the MSTM with support from the National Center for Smart Growth (NCSG) at the University of Maryland and Parsons Brinckerhoff. MSTM is a multi-level model that covers local trips and long-distance trips as well as person travel and freight. The model incorporates the two MPO models in the region and resolves differences between them, especially with regard to transit trip making. It has become a policy decision support tool that is

applied extensively for scenario analysis, corridor studies, project forecasts and future transportation performance measurement.

Recently, NCSG extended the MSTM with an auto-ownership model. This model considers household attributes, such as income, size and number of workers, and zonal attributes, namely density and transit accessibility. A logistic regression function was estimated to simulate the number of cars for every household in the study area.

[NYMTC Truck Model](#)

For the New York Metropolitan Area, the National Center for Smart Growth has implemented a bi-level truck model, covering long-distance flows at the national level and short-distance flows within the New York Metropolitan Area.

The national level is driven by commodity flows that are disaggregated to zones using input/output coefficients. Subsequently, flows are converted from tons into trucks using payload factors. International border crossings with Canada and Mexico, marine ports and airports are represented as specific freight flow nodes.

To model short-distance truck flows, the trip generation/distribution approach was revised substantially. Traditionally, the Quick Response Freight Manual (QRFM), published by the Federal Highway Administration, is used to calculate truck trip generation. However, this method tends to perform poorly when used in different geographic contexts. In this project, a synthetic matrix estimation was implemented to calculate “ideal” trip productions for the New York Metropolitan Area. Those trip productions were subsequently used as the dependent variable in a multiple regression. Using zonal attributes, such as employment by type, accessibilities, and densities, as independent variables allowed estimating local production rates.

Furthermore, goods shipments through marine ports and airports were represented explicitly. A new concept for an empty truck model was developed and implemented in addition. The truck model was integrated with New York’s Best Practice Model, a state-of-the-art travel demand model.

[TRIAD Freight Model Framework](#)

NCSG designed a freight modeling framework for the TRIAD metropolitan area of Greensboro, Winston-Salem, Burlington and High Point in North Carolina. The framework is designed as a two-layer approach. The national layer covers long-distance flows using a commodity flow model. The local layer is envisioned to use a tour-making algorithm to resemble tours traveled by trucks. Major freight nodes (such as distribution centers, warehouses, large retail facilities, hospitals, large manufacturers) are represented explicitly, and a survey conducted in fall 2014 will collect detailed data on 100 such freight nodes.

[Methods for Modeling Travel Time Reliability](#)

How can an agency include a value for travel time reliability (VTTR) in a benefit-cost analysis (BCA) when making congestion reduction-related project investment decisions? This project builds on the experiences of the Maryland State Highway Administration (MSHA) and their on-going efforts to include reliability into their planning and programming processes. The research

team developed a proposed travel time data-driven methodology that uses local travel time data to develop localized values of the reliability.

Because the proposed method is data-driven, it requires access to fine granularity and long-term archived travel time data which is now becoming more widely available through third party probe data providers. While the travel time data driven methodology shows significant promise, it does require a rigorous validation of hypotheses underlying the methodological developments as well as validation of application results. This report shows that MSHA's current use of a Reliability Ratio can be defended through the results of a literature search and the application of the proposed travel-time data driven methodology. The report also shows how MSHA currently uses the value of travel time reliability in selecting short-term congestion relief projects as well as how the output of the proposed travel time data-driven methodology can be used both in short-term and long-term project prioritization and selection. The information (literature, data-driven methodology, application examples) documented in this report could help all agencies looking to incorporate VTTR in their investment decision processes.

Place Type

In Maryland, transportation needs and appropriate strategies vary depending on the land use, economic, and demographic characteristics of particular areas. In order to better understand the needs and to support broader statewide policy and planning goals, transportation "Place Types" is an important effort to incorporate land use into transportation decision making. The goal of the Place Type task is to provide maps for four Place Types defined in the 2035 Maryland Transportation Plan (MTP).

Collaborating with the Maryland Department of Transportation (MDOT), the NCSG has provided a comprehensive review on the state of the art and the state of the practice on the Place Types. The NCSG also collected data from multiple sources and conducted analysis by using these data. A variety of approaches of mapping the Place Types were also demonstrated for MDOT.

Direct Ridership Model (DRM) for MDOT

Maryland aims to double its transit ridership by the end of 2020. Funded by the Maryland Department of Transportation (MDOT), the Direct Ridership Model (DRM) will estimate ridership as a function of station environment and transit service features rather than using mode choice results from large scale traditional models. This new type of model has been particularly favored for estimating the benefits of smart growth policies such as Transit Oriented Development (TOD).

The TPRG developed DRMs of rail transit stations, namely light rail, commuter rail, Baltimore metro, and Washington D.C. metro for the state of Maryland. Data for 117 rail stations were gathered from a variety of sources and categorized by transit service characteristics, station built environment features and social-demographic variables. For light rail stations, employment at half-mile buffer areas, service level, feeder bus connectivity, station location, distance to the nearest station, and terminal stations are significant factors affecting ridership. For commuter rail stations only feeder bus connection is found to be significant. The policy implications of the results are discussed in the report.

Methods for Modeling and Use of the Value of Travel Time Reliability

How can an agency include a value for travel time reliability (VTTR) in a benefit-cost analysis (BCA) when making congestion reduction-related project investment decisions? This project builds on the experiences of the Maryland State Highway Administration (MSHA) and their ongoing efforts to include reliability into their planning and programming processes. The research team developed a proposed travel time data-driven methodology that uses local travel time data to develop localized values of the reliability.

Because the proposed method is data-driven, it requires access to fine granularity and long-term archived travel time data which is now becoming more widely available through third party probe data providers. The methodology is based on Real Options theory from the finance field. While the travel time data driven methodology shows significant promise, it does require a rigorous validation of hypotheses underlying the methodological developments as well as validation of application results. This report shows that MSHA's current use of a Reliability Ratio can be defended through the results of a literature search and the application of the proposed travel-time data driven methodology. The report also shows how MSHA currently uses the value of travel time reliability in selecting short-term congestion relief projects as well as how the output of the proposed travel time data-driven methodology can be used both in short-term and long-term project prioritization and selection. The information (literature, data-driven methodology, application examples) documented in this report could help all agencies looking to incorporate VTTR in their investment decision processes.

Inclusion of Time-Dependent Networks In MSTM: Proof Of Concept

As a way of improving the understanding of daily network conditions but avoiding the problems of detailed data collection and validation, a proof of concept dynamic network model of MSTM has been developed. The very large MSTM network, along with the MSTM demand data, formed the primary input to the DTA model. The project team combined MSTM input with survey data from the Baltimore and Washington areas to construct a temporally distributed trip table for input to network analysis. In addition, the project team used three sets of data for validation: daily and hourly traffic volume counts and screenline volumes.

The Maryland State Highway Administration (SHA) uses the Maryland Statewide Transportation Model (MSTM) to analyze traffic issues throughout the state including traffic in rural areas, freight movements and travel between the Baltimore and Washington Metropolitan areas. The model has been well calibrated and validated and is currently being used for analysis.

While the MSTM framework assists in planning and decision-making; as with many statewide travel demand models, it is macroscopic and static in nature without the capability to analyze the spatial and temporal aspects of congestion at a higher resolution. It relies on static assignment procedures for four time periods and does not account for dynamic network conditions. In addition, like with other static models, trips are assigned to a single time period and assumed to complete within that time period. However, effective planning requires consideration of representing user response to issues such as peak spreading, freight analysis and congestion at finer resolutions. The applications for which a time-dependent modeling approach can assist the statewide models include: (i) tracking statewide time-dependent flows,

(ii) more accurate representation of congestion, (iii) analyzing impact of temporal travel restrictions, (iv) analyzing impact of peak hour tolling, and (v) tracking time-dependent freight flows.

[Maryland Department of Environment](#)

For the Maryland Department of the Environment, we will conduct studies to determine the potential effects of new highway projects on Greenhouse Gas (GHG) emissions. These studies will provide assistance to local communities in understanding the effects of new highway projects.

HOUSING POLICY GROUP

Housing Strategies Group (HSG) was established in 2010 to conduct housing policy research, while making connections to Smart Growth and sustainability. HSG is engaged in research, teaching and public education with respect to issues such as housing affordability, matching workforce housing with employment opportunities and expanding housing choice to meet changing lifestyles.

[Planning for Equitable Development in Langley Park, MD](#)

This project, funded by the U.S. Environmental Protection Agency and the Maryland Department of Housing and Community Development, will explore the threats and opportunities associated with the development of the Purple Line rail transit stop in the neighborhood of Langley Park, Maryland, a low-income immigrant community that stands to change considerably as the Purple Line attracts new investment. The focus of the project is on impacts to residents and small businesses. Following a process that involves extensive community engagement and data analysis, we will prepare a plan that helps community residents and local, state, and federal policy makers better coordinate investment decisions with community aspirations.

[Baltimore Regional Housing Plan](#)

The Baltimore region was recently awarded a Sustainable Communities Regional Planning Grant from the U.S. Department of Housing and Urban Development (HUD). An important component of this plan is a regional housing plan. Dr. Dawkins was hired as a consultant, teaming with the Innovative Housing Institute, Bay Area Economics, and the Jacob France Institute, to prepare the regional housing plan. A draft of the plan has been prepared and will be released to the public in late November, 2014.

[A Picture of Disability and Designated Housing](#)

This project, funded by the U.S. Department of Housing and Urban Development, will result in HUD's first "Picture of Disability and Designated Housing" report, to be prepared by Dr. Dawkins. To prepare this report, Dr. Dawkins will analyze HUD administrative data on disabled HUD-assisted households and characterize the extent to which HUD's programs adequately house those with various disabilities.

[Research Supporting the Neighborhood Stabilization and Homeownership \(NSHO\) Workgroup](#)

Dr. Dawkins is currently teaming with The Reinvestment Fund and the Maryland Department of Housing and Community Development to prepare research supporting the NSHO workgroup,

appointed by the Maryland House of Delegates to study the impact of the financial crisis on historically owner-occupied neighborhoods and to identify resources and strategies and recommendations to preserve the stability of historically owner-occupied neighborhoods and promote homeownership in these neighborhoods. Preliminary research from this report will be presented at the NSHO meeting in November, and the final report will be prepared by the end of December, 2014.

Driving to Opportunity

This project, funded by the U.S. Department of Housing and Urban Development and completed in collaboration with the Urban Institute and UCLA, addresses three questions. First, how do different voucher recipients sort into different neighborhoods? Second, what role does transportation play in voucher users' residential choices? Third, what role does residential choice play in households' access to automobiles? The study provides better information about how low-income households weigh transportation, housing, and neighborhood characteristics as they decide where to live. A growing number of studies address this issue; however, they typically do not include all three factors and, importantly, do not specifically focus on low-income households. The final report for this project has been delivered to HUD, and several journal articles from the work have been published or are under review. We have also disseminated the work on the Urban Institute website and in several conference presentations. The work has received considerable attention from several national media outlets.

PLANNING AND DESIGN CENTER

The Planning and Design Center (PD&C), founded in 2012, is the newest addition to the National Center for Smart Growth at the University of Maryland. The PD&C assists local, regional and state agencies in Maryland and across the nation on a wide range of projects. These include land use planning, urban design, integrated land use/transportation planning, economic analysis, agricultural preservation, housing and environmental issues. A particular strength of the PD&C is its extensive modeling and visualization capabilities.

The PD&C draws on the substantial expertise of the faculty and practitioners associated with the NCSG and throughout the University to apply their expertise to planning for sustainability. Drawing on the experience of its staff in nationally award-winning growth management work, the PD&C assists with comprehensive plans, Smart Growth audits, corridor planning, MPO scenario-based planning, and multi-modal planning.

Prince George's County Zoning Code Rewrite

NCSG was part of a team led by Clarion Associates in an ambitious rewrite to simplify and streamline an inefficient and confusing 1,000 page document for this large and growing County adjacent to Washington, DC. Uri led the code-general plan linkage and code testing and visualization aspects of this three-year project, beginning in 2014. Reducing inter and intra-departmental silos and adjusting Council micro-management of submissions part of the multi-stakeholder challenge.

Prince George's County Subarea 4 Study

NCSG participated in a team led by ERM that focused an 18 month update to a sector plan which addressed conflicts between industrial and residential uses in seven industrial areas within a large part of the County inside Washington Beltway; study also evaluated the economic potential of the areas and developed recommendations accordingly. Stakeholders include adjacent residential communities, industrial owners and tenants and Council members accountable to these areas. Tasks included updated a study of industrial trends by URSP faculty and connecting intervention options to the concurrently evolving zoning code rewrite.

Reforming the Planning System in Israel

Uri coordinated the Israel Ministry of Interior (MOI) 2014 team's US visit and Case Study of Maryland as input into a major overhaul of the top-down Israeli planning system to improve its efficiency and local control and to increase the supply and production of affordable housing. Interviews with URSP and NCSG faculty provided the MOI team with insight into Maryland's state-involved planning regime and its evolution and challenges. The case study generated a joint paper by US and Israeli planners and contributed to legislative initiatives in Israel and increased collaboration between URSP and Israeli universities.

Climate Change Mitigation Analysis, Maryland Department of the Environment

Uri supervised and participated in a final review of the Governor's ambitious Statewide Climate Change Plan and developed options for additional land use/transportation mitigation measures and impact assessments on emissions. Analysis of the CAP's potential to achieve targets was accomplished through statewide parcel-level modeling of mobile and building emissions. Stakeholders included the state Departments of the Environment, Transportation and Planning. Completed in 2013, the work has led to further testing by NCSG of the emissions impacts of transportation projects and has informed several papers by NCSG researchers.

Scenario/Sketch Planning Tools for Regional Sustainability

This applied research project primed by Cambridge Systematics with Uri Avin as PI is directed at enhancing planners' understanding of software tools for regional scenario planning. Involves interviews with practitioners, 8 case studies of applied projects and recommendations for guidance in practice. This 18 month study, begun in 2013, assesses both current and emerging tools and how they relate to various approaches to scenario –based planning.

FHWA Guidebook for Performance Based Scenario Planning

Related to the above project, is a 2014 contract as a subcontractor to ICF International in which Uri is providing guidance on the update of a national guidebook on how to relate performance-based planning, the new federal emphasis, to regional scenario planning, now elevated by federal guidelines as a desired approach for Metropolitan Planning Organizations.

Statewide Fiscal Impact Analysis, NCSG

As part of an internal NCSG's statewide planning and analysis efforts in 2012/2013, Uri helped develop an analytical framework for a study of statewide infrastructure costs for Maryland's Roads, Schools and Wastewater Treatment Plants to assess their sensitivity to alternative land use patterns. Such analysis at a statewide scale poses difficult methodological challenges but

represents a very important and neglected aspect of regional and statewide smart growth planning nevertheless.

Training Programs and Applications with CommunityViz, Maryland Counties

Uri spearheaded the development of in-house capacity and certification in the application of this powerful GIS-based software and developed training program in its use for Montgomery and Howard County. Follow on work ensued with Howard County to apply *CommunityViz* to a subarea plan and site selection challenge in Southeast Howard County's US1 commercial revitalization corridor. Here NCSG and RCLCo evaluated various sites under various program and zoning assumptions including BRT support.

Partnership for Action Learning in Sustainability (PALS), UMD

Uri directs this new program, supported by the Provost, to identify and match a wide variety of faculty and courses across the entire campus with the wide range of sustainability-focused projects identified by a partner community. The pilot jurisdiction is the City of Frederick, MD and the collaboration began in Fall 2014 with a total of 30 courses spread over the two semesters and involving 10 schools and colleges across the campus and 350 students. PALS is now one of the largest action learning initiatives in the country and its mission is to provide high-quality, low-cost assistance to local governments while creating an active and valuable real-world learning experience for the University's graduate and undergraduate students. Proposals from jurisdictions competing for the next iteration of PALS will be received in December, 2014.

RECENT PUBLICATIONS

(Organized Alphabetically)

Uri Avin

Selected Recent Publications

- Equity in Scenario Planning: HUD Guidance Paper by Uri Avin FAICP et al, forthcoming 2014, HUD Capacity–Building Series for national Sustainable Communities Initiative program
- The Plan for the Valleys Turns 50: Legend and Legacy, Planning Magazine, October 2013
- Tools for Building Scenarios: Sorting out what to use when, Planning Magazine, December 2012
- An Afterword on Tools for Scenario Planning, Special edition of the APA Intergovernmental Division Newsletter, November 2012

Selected Recent Conference Presentations

- Avin, Uri. 2014. Best Practices for Comprehensive Plan Implementation. American Planning Association National Conference, Atlanta, GA
- Avin, Uri. 2014. Even Smarter Growth? Land Use, Transportation, and GHG Emissions in Maryland. TRB, Washington, DC
- Avin, Uri. 2014. Using Metropolitan Scenario Planning to Bring Clarity to an Uncertain Future. TRB, Washington, DC
- Avin, Uri. 2013. Best Apps for Scenarios; Best Scenarios for Apps. Keynote Speaker, American Planning Association, Orlando, FL
- Avin, Uri. 2013. The Future of the Planning Profession. American Planning Association National Conference, Chicago, IL
- Avin, Uri. 2013. Mega-Regions: Urban Form, Transportation and Sustainability. American Planning Association National Conference, Chicago, IL
- Avin, Uri. 2013. Workshop on Comprehensive Plan Standards for Sustaining Places. American Planning Association National Conference, Chicago, IL
- Avin, Uri. 2012. Statewide Planning with Mega-regions in Mind. American Association of Metropolitan Planning Organizations National Conference, Saratoga Springs, NY
- Avin, Uri. 2012. Planning for Livability and Sustainability: Maine Retrospective. American Association of Metropolitan Planning Organizations Saratoga Springs, NY
- Avin, Uri. 2012. Approaches to Scenario-Building. TRB, Washington, DC
- Avin, Uri. 2012. The Next Generation of Web-Based Scenario Tools. American Planning Association National Conference, Los Angeles, CA

Yuchen Cui

Selected Recent Peer Reviewed Journal Publications

- Cui, Y., Mishra, S., Welch, T., Land Use Effects on Bicycle Ridership: A Framework for State Planning Agencies", *Journal of Transport Geography*, 41(2014), pp. 220–228.
- Sandiogo-Torres, M., Cui, Y., Adams, A., Allen, D., Carrel, A., Guo, J., Rendon, A., Gonzalez, M., LaRowe, T., Schoeller, D., Familial and Individual Predictors of Obesity and Insulin Resistance in Urban Hispanic Children, *Pediatrics Obesity*, in press.

Selected Recent Conference Presentations

- Cui, Y., Mishra, S., Welch, T., Estimating Land Use Effects on Bicycle Ridership, Transportation Research Board 94th Annual Meeting, Washington, D.C., 2015.
- Cui, Y., Resolution of Networks in Travel Forecasting Models, Ph.D. Workshop, Association of Collegiate Schools of Planning 54th Annual Conference, Philadelphia, PA, 2014.
- Avin, U., Welch, T., Knaap, G., Ducca, F., Mishra, S., Cui, Y., Erdogan, S., Even Smarter Growth? Land Use, Transportation And Greenhouse Gas In Maryland, Transportation Research Board 93rd Annual Meeting, Washington, D.C., 2014.
- Cui, Y., Defining the Spatial Resolution of the Transportation Network in Travel Demand Models, Doctoral Student Research in Transportation Modeling, Transportation Research Board 93rd Annual Meeting, Washington, D.C., 2014

Casey Dawkins

Selected Recent Peer Reviewed Journal Publications

- Hepp, Selma and Casey Dawkins. 2013. Education and Realtors' Success. *Journal of the Center for Real Estate Studies*. 1,2.
- Dawkins, Casey J. 2013. Exploring the Spatial Distribution of Low Income Housing Tax Credit Properties: Implications for Fair Housing and Poverty Deconcentration Policies. *Journal of the American Planning Association*. 79-3: 222-234.
- Nelson, Arthur C., Casey J. Dawkins, Katherine G. Kittrell and Reid Ewing. (forthcoming). The Link between Professional Performing Arts and Knowledge Class Growth: Implications for Metropolitan Economic Development. *Economic Development Quarterly*.
- Dawkins, Casey J., Jae Sik Jeon, Rolf Pendall (forthcoming). Transportation Access, Rental Vouchers, and Neighborhood Satisfaction: Evidence from the Moving to Opportunity Experiment. *Housing Policy Debate*.

Selected Recent Conference Presentations

- Dawkins, Casey. 2011. Exploring the Spatial Distribution of Low Income Housing Tax Credits. Presented at the Association of Collegiate Schools of Planning Annual Conference, Salt Lake City, Utah.
- Bieri, David S. and Casey J. Dawkins. 2013. Housing Affordability with Local Wage and Price Variation. Presented at the Annual Association of Collegiate Schools of Planning Conference, Cincinnati, Ohio.
- Rolf Pendall, Evelyn Blumenberg, Casey Dawkins. 2014. Driving to Opportunity: Understanding Links Among Transportation Access, Residential Outcomes, and Economic Opportunity for Housing Voucher Recipients. Transportation Research Board Conference, Washington, D.C.
- Rolf Pendall, Evelyn Blumenberg, Casey Dawkins. 2014. Driving to Opportunity: Understanding Links Among Transportation Access, Residential Outcomes, and Economic Opportunity for Housing Voucher Recipients. Urban Institute, Washington, D.C.
- Knaap, Elijah and Casey Dawkins. 2014. How Can Housing Voucher Holders Find and Remain in Better Neighborhoods? Evidence from the Moving to Opportunity Experiment in Baltimore. Presented at the Annual Association of Collegiate Schools of Planning Conference, Philadelphia, PA.
- Dawkins, Casey, Jae Sik Jeon, and Rolf Pendall. 2014. How Vehicle Access Enables Low-Income Households to Live in Better Neighborhoods. Presented at the Annual Association of Collegiate Schools of Planning Conference, Philadelphia, PA.

Selected Recent Invited Lectures

- Dawkins, Casey. 2010. Pricing and Social Equity, Expert Panel Participant. University of Southern California.
- Dawkins, Casey. 2010. Exploring the Spatial Distribution of Low Income Housing Tax Credit Properties. Metropolitan Institute Lecture Series, Virginia Tech, Alexandria, Virginia.
- Dawkins, Casey. 2011. Exploring the Spatial Distribution of Low Income Housing Tax Credit Properties. U.S. Department of Housing and Urban Development, Washington, DC.
- Dawkins, Casey. 2011. Measuring Potential Discrimination in HUD Assisted Housing Programs: Indiana and Illinois Case Studies. U.S. Department of Housing and Urban Development, Washington, DC.
- Dawkins, Casey. 2011. Public Housing Reform and Desegregation: The Case of Chicago's Plan for Transformation. Presented at Virginia Tech, Alexandria, VA.
- Dawkins, Casey. 2014. Quantifying Local Segregation Patterns: A Proposed Method and Application to the Case of Chicago's Plan for Transformation. Presented at Columbia University, New York.
- Dawkins, Casey and Rolf Moeckel. 2014. Transit-Induced Gentrification. Presented at the NCSG-LABEX Joint Symposium. Washington, D.C.

Chengri Ding

- Ding, C., Y. Niu, and E. Lichtenberg, 2014, Spending Preferences of Local Officials with Off-budget Land Revenues of Chinese Cities, *China Economic Review* (forthcoming).
- Knaap, E, C. Ding, Yi Niu, and S. Mishra, 2014, Polycentrism as a Sustainable Development Strategy: Empirical Analysis from the State of Maryland, *Journal of Urbanism: International Research on Placemaking and Urban Sustainability* (forthcoming).
- Ding, C., 2014, Land and Development in China, *The Oxford Companion to the Economics of China*, Edited by S. Fan, R. Kanbur, S.J. Wei and X. Zhang, Oxford Press, Paris.
- Ding, C and X. Zhao 2014, Land Market, Land Development and Urban Spatial Structure in Beijing, *Land Use Policy*, 40 (2014) 83–90.
- Yi, N, C. Ding, and G. Knaap, 2013, Employment Centers and Agglomeration Economies: Foundation of a Spatial Economic Development Strategy, *Economic Development Quarterly* (forthcoming).
- Ding, C, 2013, Building Height Restrictions, Land Development and Economics Costs, *Land Use Policy* 30, 485-495.
- Ding, C, 2013, Transportation Development, Regional Concentration and Economic Growth, *Urban Studies*, Vol. 50, No. 2: 312-328.
- Ding, C., Z. Li, L. He, Y. Niu, 2014, Non-Survey Method in Estimating the Relation between Industrial Sectors and Urban Land Uses, *City Planning Review* (In Chinese, forthcoming).
- Ding, C. and Y. Niu, Beijing 2030 Envision and Policy Implication, *Urban Studies* (In Chinese, forthcoming).
- Ding, C. and X. Li, 2013, Integrating of Economic Plan and Urban Plan: in Case of Beijing, *Urban and Rural Planning*, No. 7: 35-43 (In Chinese).
- Ding, C. and S. Tan, 2013, Urbanization in China: China Style, Issues and Policy Misperceptions, *Urban Studies*, Vol. 145, No. 10, 28-34 (In Chinese)

Fred Ducca

Selected Recent Reports

- Mishra, S., Ducca F., and Zhu X. (2013). An Integrated Framework for Modeling Freight Mode and Route Choice. Maryland State Highway Administration Research Report.
- Ducca, F., Mishra, S., Welsh, T., Brinckerhoff, P., Donnelly R., Weidner, T., Moeckel, R., Moore, T., Pozdena, R., Deal, B., and Chakraborty, A. (2012). A Framework for Mega-Region Analysis: Development and Proof of Concept. Report to the Federal Highway Administration.
- Ducca, F., Ma, T., Mishra, S., Welch, T., Brinckerhoff, P., Moeckel, R., Weidner, T., Moore, T., and Pozdena, R. The Chesapeake Megaregion Market Analysis. Report to the Federal Highway Administration.

Sevgi Erdogan

Selected Recent Peer Reviewed Journal Publications

- Sevgi Erdogan, Cinzia Cirillo and Jean-Michel Tremblay. Ridesharing as a Green Commute Alternative: A Case Study at the University of Maryland Campus. *International Journal of Sustainable Transportation*, 2013, DOI:10.1080/15568318.2013.800619, Accepted author version posted online: 11 Jul 2014.
- Sevgi Erdogan, Timothy Welch, Gerrit J. Knaap, G. and Fredrick W. Ducca. What to Expect in 2030: The Impacts of Fuel Prices and Fuel Efficiency on Land Use and Transportation. *Transportation Research Record*, Volume 2397(Planning 2013), 89-98, 2013.
- Sevgi Erdogan and Elise Miller-Hooks. A Green Vehicle Routing Problem. *Transportation Research Part E: Logistics and Transportation Review*, 48(1), 100-114, 2012.

Selected Recent Conference Presentations

- Erdogan, S., Welch, T., Knaap, G & Ducca, F. What to Expect In 2030: The Impacts of Fuel Prices and Fuel Efficiency on Land Use and Transportation. *Association of European Schools of Planning Conference*. Ankara, Turkey, July 11-15, 2012.
- Avin, U., Welch, T. F., Knaap, G.J, Ducca, F., Mishra, S, Chiu, Y., and Erdogan, S. Even Smarter Growth? Land Use, Transportation and Greenhouse Gas in Maryland. *Proceedings of the 93rd Annual Meeting of the Transportation Research Board*, Washington, D.C., January 12-16, 2014
- Liu, Chao, Erdogan, S., Ma, T. and Ducca, F.W., How to Increase Rail Ridership in Maryland? Direct Ridership Models (DRM) for Policy Guidance. *Proceedings of the 93rd Annual Meeting of the Transportation Research Board*, Washington, D.C. January 12-16, 2014.

Technical Reports

- Ducca, F. W., Erdogan, S., Gallivan, P., Knaap, G. J., Mishra, S., Petto, G., Wang, Y., and Welch T.F. Maryland Scenarios Project Draft Final Year 3 Report. National Center for Smart Growth Research and Education (NSCGRE), Transportation Policy Research Group (TPRG) Report, August 2012.
- Erdogan, S., F.W. Ducca and Mollanejad, M. Inclusion of Time Dependent Networks in MSTM. Prepared by the National Center for Smart Growth Research and Education at the University of Maryland for Maryland SHA, Interim Task 1 Report, June 2013.
- Erdogan, S., F.W. Ducca, Patnam, K., Zuxuan, D., Yang, D., and Wang, X., Inclusion of Time Dependent Networks in Maryland Statewide Transportation Model: Proof of Concept. Maryland SHA Research Report MD-14-3-17 by the national Center for Smart Growth Research and Education at the University of Maryland, Final Report, July 2014.

Selected Recent Peer Reviewed Journal Publications

- Wenbo Fan, 2015, Introduction and Evaluation of FAIR highway: A Credit-based Congestion Pricing Scheme, *Journal of Transportation Systems Engineering and Information Technology*, 2015, Accepted (In Chinese, EI indexed Journal).
- Wenbo Fan, Xue Lv, and Hongyan Xiang, 2014, Parking pricing of two types of parking facilities under three operation regimes, *Journal of Transportation Systems Engineering and Information Technology*, 14(6): 30-35 (In Chinese, EI indexed Journal).
- Xinguo Jiang, Haitao Zheng, Yanjun Qiu, and Wenbo Fan, 2015, Differences in Injury Severities between Two-Vehicle and Three-Vehicle Crashes, *Traffic Injury Prevention*, 16, 289–297.
- Wenbo Fan and Xinguo Jiang, 2013, Tradable mobility permits in roadway capacity allocation: review and appraisal, *Transport Policy*, 30(11): 132-142.
- Wenbo Fan, Muhammad Babar Khan, Jian Ma, and Xinguo Jiang, 2014, Bilevel Programming Model for Locating Park-and-Ride Facilities, *Journal of Urban Planning and Development-ASCE*, 140(3): 04014007.
- Wenbo Fan, 2013, Metro based park and ride reliability analysis, *Journal of Transportation Systems Engineering and Information Technology*, 13(2): 57-62 (In Chinese, EI indexed Journal).
- Wenbo Fan, 2013, Pricing model of three-class parking facilities under user equilibrium conditions, *Journal of Chongqing Jiaotong University (Natural Science)* (In Chinese).
- Wenbo Fan, 2013, Lessons from the development of park-and-ride system in Singapore, *Urban Mass Transport*, 16(8): 10-13 (In Chinese).
- Wenbo Fan, 2013, Prospects of applying the tradable permit approach in traffic demand management, *Journal of Chongqing Jiaotong University*, 32(6): 1219-1223. (Natural Science) (In Chinese).
- Wenbo Fan, 2013, Cost-benefit analysis of a credit-based congestion pricing scheme, *Journal of Chongqing Jiaotong University (Natural Science)*, 32(5): 1091-1095 (In Chinese, EI indexed Journal).
- Wenbo Fan, 2012, The experience and enlightenment of Oxford city's bus-based park and ride, *Journal of Transportation Engineering and Information*, 11(1): 40-48 (In Chinese, EI indexed Journal).
- Wenbo Fan and Khan, M.B., 2012, Modeling the parking pricing of multiple parking facilities under different operation regimes, *Journal of Transportation Technologies*, 2(3), pp. 260-266.
- Wenbo Fan, 2012, Reliability analysis of stochastic park-and-ride network, *Journal of Modern Transportation*, 20(1), pp. 57-64.

Hiroyuki Iseki

Selected Recent Peer Reviewed Journal Publications

- Iseki, Hiroyuki, and Michael J. Smart (2012), "How Do People Perceive Service Attributes at Transit Facilities?" *Transportation Research Record: Journal of the Transportation Research Board* 2274.1: 164-174
- Iseki, Hiroyuki and Mathew Tingstrom. 2014. "A New Approach in the Bikeshed Analysis with Consideration of Topography, Street Connectivity, and Energy Consumption" submitted for consideration for publication in *Computers, the Environment, and Urban Systems*, 48, 166–177.
- Mishra, S., Iseki, H, and Moeckel, R. 2014. "Multi entity perspective freight demand modeling technique: Varying objectives and outcomes," *Transport Policy*, Volume 35, Pages 176–185.
- Iseki, Hiroyuki and Mike Smart. 2012. "How Do People Perceive Service Attributes at Transit Facilities? An Examination of Perceptions of Transit Service by Transit User Demographics and Trip Characteristics," *Journal of the Transportation Research Board*, 2274, 164-174.
- Iseki, Hiroyuki and Alexander Demisch. 2012. "Examining the Linkages between Electronic Roadway Tolling Technologies and Road Pricing Policy Objectives," *Research in Transportation Economics*, 36(1), 121-132.
- Iseki, Hiroyuki and Rebecca Houtman. 2012. "Examination of Recent Developments in DBFO Public Private Partnership Transportation Projects in North America," *Research in Transportation Economics*, 36(1), 73-84.
- Rivasplata, Charles, Hiroyuki Iseki, and Adam Smith. 2012. "Transit Coordination in the U.S.A: A Survey of Current Practice," *Journal of Public Transportation*, 15 (1), 53-73.

Monograph Chapters

- Iseki, Hiroyuki, and Rubaba Ali. *Forthcoming. Net Effects of Gas Price Changes on Transit Ridership in US Urban Areas*, The Norman Y. Mineta International Institute for Surface Transportation Policy Studies, College of Business, San Jose State University, San Jose, California. 119 pages.
- Kolozsvari, Douglas, and Hiroyuki Iseki. 2014. "Rail Transit Systems, Worldwide," in *Encyclopedia of Transportation, Social Science and Policy*, The SAGE Publications.
- Kolozsvari, Douglas, and Hiroyuki Iseki. 2014. "Parking Enforcement," in *Encyclopedia of Transportation, Social Science and Policy*, The SAGE Publications.

Working Papers

- Iseki, Hiroyuki, Qing Li, and Laura Richards. 2013. Examination of the Pricing Structure of Toll Facilities by Vehicle Class to Account for Social Costs of Driving and Its Effects on Traffic, Toll Revenue, Emission, and EASL. Center for Integrated Transportation Systems Management (CITSM) of University of Maryland, College Park. 103 pages.

- Yoh Allison, Michael Smart, Norman Wong, Hiroyuki Iseki, and Brian D. Taylor. 2012. *Tool Development to Evaluate the Performance of Intermodal Connectivity (EPIC) to Improve Public Transportation – Phase 2B*, Report No. CA13-1230, prepared for the California Department of Transportation, September 2012. 72 pages.

Short Articles

- Iseki, Hiroyuki. 2012. "Making the Commute Productive," *Work Style, The Work Style Company*, Vol. 10, 2 pages. (A *light*-summary version is available on: <http://www.theworkstylemagazine.com/light>.)

Conference Papers

- Oba, Tetsuharu and Hiroyuki Iseki., *Analysis of Spatial Locations and Attributes of Surface Parking Lots and Their Effects on Cityscape in Historic Central Districts in Kyoto, Japan, and Philadelphia, Pennsylvania*, the Annual Meeting of the Transportation Research Board (TRB) 93rd annual meeting, Washington, D.C., January, 2014.
- Oba, Tetsuharu and Hiroyuki Iseki. *Spatial analysis of surface parking lots location and cityscape preservation*, accepted for presentation at the 12th World Conference on Transportation Research (WCTR), Rio de Janeiro, Brazil, 15-18 July 2013.
- Iseki, Hiroyuki and Mathew Tingstrom. *A GIS Bikeability/Bikeshed Analysis Incorporating Topography, Street Network and Street Connectivity*, the 12th World Conference on Transportation Research (WCTR), Rio de Janeiro, Brazil, 15-18 July 2013.
- Iseki, Hiroyuki and Mathew Tingstrom. *A New Approach in the GIS Bikeshed Analysis with Consideration of Topography, Street Connectivity, and Energy Consumption*, presented at the Transportation Research Board (TRB) 92nd annual meeting, Washington, D.C., January, 2013.
- Iseki, Hiroyuki. *A New State of Privatization for U.S. Transit? A Delegated Management Contract in New Orleans*, the 12th World Conference on Transportation Research (WCTR), Rio de Janeiro, Brazil, 15-18 July 2013.
- Mishra, S., Iseki, H, and Moeckel, R., *Multi-entity Perspective Freight Demand Modeling Technique: Varying Objectives and Outcomes*, presented at the Annual Meeting of the Transportation Research Board (TRB) 92nd annual meeting, Washington, D.C., January, 2013.
- Oba, Tetsuharu, Kyotodaigaku Katsura, Kyoto Nishikyo-ku, and Hiroyuki Iseki (2013), "An Analysis of Spatial Locations and Attributes of Surface Parking Lots and Their Effects on the Cityscape in Historic Central Districts in Kyoto and Philadelphia." Submitted for Presentation in the Annual Meeting of Transportation Research Board.
- Iseki, Hiroyuki, and Qing Li (2013), "An Empirical Analysis of the Pricing Structure of Toll Facilities Based on Social Costs of Driving by Vehicle Class and Its Effects on Traffic, Toll Revenue, Emission, and ESAL." Revised and re-submitted for Presentation at the Transportation Research Board (TRB) 93rd Annual Meeting, Washington DC.
- Charles Rivasplata, Hiroyuki Iseki, and Adam Smith (2012). *Transit Coordination in the U.S.: A Survey of Current Practice*

- Allison Yoh, Norman Wong, Michael J. Smart, and Hiroyuki Iseki (2012). Tool for Assessing Station Characteristics (TASC): Identifying Service Quality Improvements at Transit Stops and Stations
- Hiroyuki Iseki and Rebecca Houtman (2012). Evaluation of progress in contractual terms: Two case studies of recent DBFO PPP projects in North America
- Hiroyuki Iseki and Alexander Demisch (2012). Examining the linkages between electronic roadway tolling technologies and road pricing policy objectives
- Hiroyuki Iseki, Michael Smart, Brian D. Taylor, and Allison Yoh (2012). Thinking Outside the Bus

Jae Sik Jeon

Selected Recent Peer Reviewed Journal Publications

- Kim, Kabsung and Jae Sik Jeon (2012). "Why Do Households Rent While Owning Houses? Housing Sub-Tenure Choice in South Korea." *Habitat International*. 36: 101-7

Working Paper

- Pendall, Rolf, Christopher Hayes, Arthur George, Zach McDade, Casey Dawkins, Jae Sik Jeon, Eli Knaap, Evelyn Blumenberg, Gregory Pierce, and Michael Smart (2014). *Driving to Opportunity: Understanding the Links among Transportation Access, Residential Outcomes, and Economic Opportunity for Housing Voucher Recipients*. Final Report, Washington, DC: The Urban Institute: 67 pages.

Selected Recent Conference Presentations

- Jeon, Jae Sik. "The Effect of Green Belt Policy Reform on the Seoul Metropolitan Area Housing Market." at Association of Collegiate Schools of Planning Conference. November 4, 2012.

Rob Jones

Selected Recent Conference Presentations

- Iseki, H and Robert Jones. (2014). Analysis of Geographic Distribution of Firms in Relation to Metro Station Proximity: Case Study of the WMATA Metro Service Area. American Collegiate Schools of Planning Conference Proceedings.
- Iseki, H and Robert Jones. (2014). Analysis of Firm Location and Relocation around Maryland and Washington DC Metro Rail Stations. Transit, Development and Forme Urbaine: Washington et Paris Proceedings.
- Jones, R and Alan Nguyen. (2014). Utilizing Demand Estimation Techniques and GIS to Prepare for an Evacuation of the Carless, National Evacuation Conference Proceedings.

Other Publications

- Spielberg, F. et al. (2013). TCRP Report 161: Methods for Forecasting Demand and Quantifying Need for Rural Passenger Transportation, Washington, D.C.: Transportation Research Board, National Research Council. (contributing author)

Eli Knaap

Selected Recent Peer Reviewed Journal Publications

- Knaap, E., Ding, C., Niu, Y., & Mishra, S. (2015). Polycentrism as a Sustainable Development Strategy. *Journal of Urbanism*. Forthcoming
- Mishra, S., Welch, T. F., Torrens, P. M., Fu, C., Zhu, H., & Knaap, E. (2014). A tool for measuring and visualizing connectivity of transit stop, route and transfer center in a multimodal transportation network. *Public Transport*, 1-23.

Selected Recent Conference Presentations

- Liu, C., Knaap, E., & Knaap, G. J. (2014). Opportunity Mapping: A conceptual Analysis and application to the Baltimore Metropolitan Area. Paper presented at Association for Public Policy and Management Annual Conference, Washington D.C.
- Ma, T., Knaap, E., & Knaap, G. J. (2014). Retail Location and Transit: An Econometric Examination of Retail Location in Prince George's and Montgomery County, Maryland.
- Knaap, E., Knaap, G. J., & Liu, C. (2014). Mapping Opportunity: A Critical Assessment (2014). Paper presented at Association of Collegiate Schools of Planning: Annual Conference, Philadelphia, PA
- Knaap, E. & Dawkins, C. (2014). MTO in Baltimore: Trajectories of Neighborhood Attainment. Paper presented at Association of Collegiate Schools of Planning: Annual Conference, Philadelphia, PA
- Knaap, E., Liu, C., & Knaap, G.J. (2013) Mapping Opportunity: Concepts & Techniques. Paper presented at Association of Association of European Schools of Planning Collegiate Schools of Planning: Annual Conference, Dublin, Ireland

Other Publications

- Pendall, R., & Hayes, C. Arthur (Taz) George, Zach McDade, Casey Dawkins, Jae Sik Jeon, Eli Knaap, Evelyn Blumenberg, Gregory Pierce, and Michael Smart. 2014. Driving to Opportunity: Understanding the Links among Transportation Access, Residential Outcomes, and Economic Opportunity for Housing Voucher Recipients.

Gerrit Knaap

Selected Recent Peer Reviewed Journal Publications

- Niu, Yi, Chengri Ding, and Gerrit-Jan Knaap, forthcoming, Employment Centers and Agglomeration Economies: Foundations of a Spatial Economic Development Strategy, *Economic Development Quarterly*.
- Erdogan, Sevgi, Timothy Welch, Gerrit-Jan Knaap, and Fred Ducca, 2013, What to Expect in 2030: Effects of Fuel Price and Fuel Economy on Land Use and Transportation, *Transportation Research Record Journal of the Transportation Research Board*, 2397: 89-98.
- Nedovic-Budic, Zorica, Gerrit-Jan Knaap, and Deirdre Joyce, 2013, Planning for States and Nation/States: A Symposium on US and European planning experience — A TransAtlantic Exploration, *The Town Planning Review*, 84(3):411-417.
- Carruthers, John I., Selma Lewis, Gerrit-Jan Knaap, and Robert N. Renner, 2012, The American Way of Land Use: A Spatial Hazard Analysis of Changes Through Time, *International Regional Science Review*, 35: 267
- Sohn, Jungyul, Songhyun Cho, Rebecca Lewis, and Gerrit-Jan Knaap, 2012, Characterizing urban sprawl on a local scale with accessibility measures, *Geographical Journal*, 178, 2:
- Lewis, Rebecca and Gerrit-Jan Knaap, 2012, Targeted Spending for Land Conservation; An Evaluation of Maryland's Rural Legacy Program; *Journal of the American Planning Association*; 78, 1: 34-52
- Knaap, Gerrit-Jan and Rebecca Lewis, 2012, Institutional Foundations for Sustainability Planning: Lessons from State Development Plans, *State and Local Government Review*; 44 , 1: 33-44
- Chakraborty, Arnab, Nikhil Kaza, Gerrit-Jan Knaap, and Brian Deal, 2012, Robust and Contingent Plans: Scenario Planning for an Uncertain World, *Journal of the American Planning Association*; 77, 3: 251-266.

Books

- Brooks, Nancy, Kieran Donaghy, and Gerrit-Jan Knaap, Ed.s, *Oxford Handbook on Urban Planning and Economics*, Oxford, UL: Oxford University Press, 2012.

Chapters in Books

- Juntunen, Lorelei, Gerrit-Jan Knaap, and Terry Moore, 2012, Fiscal Impact Analysis and the Costs of Alternative Development Patterns, in Brooks, Nancy, Kieran Donaghy, and Gerrit-Jan Knaap, Ed.s, *Oxford University Press Handbook on Planning and Economics*, Oxford, UL: Oxford University Press.
- Kaza, Nikhil and Gerrit-Jan Knaap, 2012, Principles of Planning for Economists, in Brooks, Nancy, Kieran Donaghy, and Gerrit-Jan Knaap, Ed.s, *Oxford University Press Handbook on Planning and Economics*, Oxford, UL: Oxford University Press.
- Knaap, Gerrit-Jan and Rebecca Lewis, 2012, Metropolitan Planning for Sustainability and the Hegemony of Metropolitan Regionalism. In E. Seltzer & A. Carbonell (Eds.)

American Regional Planning: Practice and Prospect. Cambridge, MA: Lincoln Institute of Land Policy.

Book Reviews

- Welch, T. F. and Knaap, G. J., 2012, Perverse Cities: Hidden Subsidies, Wonky Policy, and Urban Sprawl by Pamela Blais. Journal of Regional Science, 52: 527–528.

Chao Liu

Selected Recent Peer Reviewed Journal Publications

- Ding, C., Lin, Y., & Liu, C. (2014). Exploring the influence of built environment on tour-based commuter mode choice: A cross-classified multilevel modeling approach. Transportation Research Part D: Transport and Environment, 32, 230-238.
- Wang, X. G., C. Liu, L. Kostyniuk, Q. Shen, and B. Shan. 2014. The Influence of Street Environments on Fuel Efficiency: Insights from Naturalistic Driving. International Journal of Environmental Science and Technology. (Accepted).
- Ding, C., and C. Liu. 2014. The Impact of Employer Attitudes towards Green Commuting Programs on Reducing Auto Driving: A Mixed Method Analysis. Promet – Traffic & Transportation. 26 (2). 109-119.
- Ding, C., Y. Wang, B. Xie., and C. Liu. 2014. Understanding the Role of Built Environment on Reducing Vehicle Miles Travelled: Effects of Spatial Heterogeneity. Sustainability. 6(2):589-601.
- X. Zhu and C. Liu. 2013. Investigating the Neighborhood Effect on Hybrid Car Adaptation. Transportation Research Record (TRR) – Journal of Transportation Research Board. Vol. 2385. 37-44.
- Wang, Yaowu, Chuan Ding, Chao Liu, and Binglei Xie (2013), "An analysis of Interstate freight mode choice between truck and rail: A case study of Maryland, United States." Procedia-Social and Behavioral Sciences 96: 1239-1249.

Selected Recent Conference Presentations

- Liu, Chao, Sevgi Erdogan, Ting Ma, and Frederick W. Ducca (2014), "How to Increase Rail Ridership in Maryland? Direct Ridership Models (DRM) for Policy Guidance." In Transportation Research Board 93rd Annual Meeting, no. 14-3417.
- Liu, Chao, and Frederick W. Ducca (2012), "Exploring the Influence of Urban Form on Travel and Energy Consumption: a Tour-based or a Trip-based Analysis?" Transportation Research Board 91st Annual Meeting. No. 12-3370.

Ting Ma

Selected Recent Peer Reviewed Journal Publications

- Ma, T. & An, L. (2012) Book Review of the Triumph of the City. Journal of Urban and Regional Planning Research, 5(2).

- Ding, C., Ma, T., Lin, Y., & Liu, C. (2014). An Empirical Analysis of the Interactive Relationship between Urbanization and Motorization in China over the period 1985-2010. *China City Planning Review*, 23(1), 8-15.
- Lin, Y., Ding, C., Wu, C., Ma, T., & Jiang, X. (2013). Analysis on High Density Community Emergency Evacuation Behavior. *Planners*, 29(7), 105-109.
- Wang, Y., Ding, C., Lin, Y., Liu, C., & Ma, T. (2014). Muth-Mills Model of Urban Spatial Structure: Theory and Implications for Cities in China. *China City Planning Review*, 23(1), 60-67.

Published Translations

- Dunham-Jones, E., Williamson, J. (2013). *Retrofitting Suburbia: Urban Design Solutions for Redesigning Suburbs* (X. Zuo & T. Ma, Trans.). Beijing, China: Publishing House of Electronics Industry.
- Marten, G. G. (2012). *Human Ecology* (C. Gu, T. Ma, et al. Trans.). Beijing, China: The Commercial Press.

Selected Recent Conference Presentations

- Ting Ma. A corridor approach of transit oriented development: what the Purple Line can learn from other places. *Makeover Montgomery II: The Continuing Transformation of America's Suburbs*, May 8-10, 2014. Silver Spring, Maryland.
- Ting Ma, Frederick Ducca, Timothy F. Welch, Supin Lin, Rolf Moeckel. Megaregions--The Economic Ties: Case Study of the Chesapeake Mega-Region. 93th Annual Transportation Research Board (TRB) Conference. January 12-16, 2014. Washington, D.C.
- Chao Liu, Sevgi Erdogan, Ting Ma, Frederick Ducca. How to Increase Rail Ridership in Maryland? Direct Ridership Models (DRM) for Policy Guidance. 93th Annual Transportation Research Board (TRB) Conference. January 12-16, 2014. Washington, D.C.
- Chuan Ding, Chao Liu, Yaoyu Lin, Ting Ma. A tour-based analysis on the interrelationships of built environment, travel behavior, and car ownership. 93th Annual Transportation Research Board (TRB) Conference. January 12-16, 2014. Washington, D.C.

Rolf Moeckel

Selected Recent Peer Reviewed Journal Publications

- Moeckel, Rolf, Rick Donnelly (2014), "Gradual Rasterization: Redefining the Spatial Resolution in Transport Modeling." *Transportation Research Board 93rd Annual Meeting*. No. 14-4630.
- Moeckel, Rolf, Fussel, Rhett, Donnelly, Rick (2014) Mode choice modeling for long-distance travel. In: *Transportation Letters. The International Journal of Transportation Research*, Online Advance Article
[<http://www.maneyonline.com/doi/full/10.1179/1942787514Y.0000000031>]

- Moeckel, Rolf (2013), "Firm Location Choice Versus Job Location Choice in Microscopic Simulation Models." *Employment Location in Cities and Regions*. Springer Berlin Heidelberg. 223-242.
- Weidner, Tara, Fred Ducca, Rolf Moeckel, and Sabyasachee Mishra (2013), "Exercising a mega-region analysis framework in the Chesapeake Bay area." In *Transportation Research Board 92nd Annual Meeting*, no. 13-2236.
- Mishra, Sabyasachee, Yanli Wang, Xiaoyu Zhu, Rolf Moeckel, and Subrat Mahapatra (2013), "Comparison between Gravity and Destination Choice Models for Trip Distribution in Maryland." In *Transportation Research Board 92nd Annual Meeting*, no. 13-3196.
- Mishra, Sabyasachee, Timothy F. Welch, Rolf Moeckel, Subrat Mahapatra, and Morteza Tadayon (2013), "Development of Maryland statewide transportation model and its application in scenario planning." In *Transportation Research Board 92nd Annual Meeting*, no. 13-5024.
- Sabyasachee Mishra, Hiroyuki Iseki, Rolf Moeckel (2014) Multi entity perspective freight demand modeling technique: Varying objectives and outcomes. In: *Transport Policy*, Volume 35, September 2014, Pages 176–185.
- Ducca, Fred, Rolf Moeckel, Sabyasachee Mishra, and Tara Weidner (2012), "A Mega-region Framework for Analyzing a High Energy Price Future." In *Transportation Research Board 91st Annual Meeting*, no. 12-3556.
- Fred Ducca, Rolf Moeckel, Sabyasachee Mishra, and Tara Weidner (2012). A Mega-region Framework for Analyzing a High Energy Price Future
- Moeckel, R., Donnelly, R. (forthcoming) Gradual rasterization: Redefining spatial resolution in transport modelling. In: *Environment & Planning B*. Accepted for publication, awaiting proofs.
- Moeckel, R., Mishra, S., Ducca, F., Weidner, T. (forthcoming) Mega-Regions develop as a complex systems. Horizontal and vertical integration for a Mega-Region Simulation Model. In: *International Journal of Transportation*. Accepted for publication, awaiting proofs.
- Moeckel, R., Lewis, R. (forthcoming) Two Decades of Smart Growth in Maryland (USA): Impact Assessment and Future Directions of a National Leader. In: *Informationen zur Raumentwicklung*. Accepted for publication, awaiting proofs.

Harutyun Shahumyan

Selected Recent Peer Reviewed Journal Publications

- O'Neill E., Brennan M., Brereton F., Shahumyan H. (2014) Exploring a Spatial Statistical Approach to Quantify Flood Risk Perception Using Cognitive Maps. *Natural Hazards*. DOI: 10.1007/s11069-014-1559-8. Springer Netherlands
- Shahumyan H., Williams B., Petrov L., Foley W. (2014) Regional Development Scenario Evaluation through Land Use Modelling and Opportunity Mapping. *Land* 2014, 3, 1180-1213.

- Petrov L., Shahumyan H., Williams B., Convery S. (2013) Applying Spatial Indicators to Support a Sustainable Urban Future. *Environmental Practice*, Volume 15, Issue 01, March 2013, pp 19-32.
- Williams B., Foley W., Shahumyan H., Petrov L. (2013) Transport Policy, Land-Use Dynamics and Economic Development Patterns: Scenario Modelling for the Dublin-Dundalk-Newry-Belfast Corridor. *Borderlands: The Journal of Spatial Planning in Ireland*, Issue 3 January 2013, pp. 95-112.

Tim Welch

Selected Recent Peer Reviewed Journal Publications

- Welch, T. F. (2013). Equity in transport: The distribution of transit access and connectivity among affordable housing units. *Transport Policy*, 30, 283-293.
- Welch, T. F., & Mishra, S. (2013). A measure of equity for public transit connectivity. *Journal of Transport Geography*, 33, 29-41.
- Mishra, S., Welch, T. & Chakraborty (2013). An Experiment in Mega-Regional Road Pricing Using Advanced Commuter Behavior Analysis. *Journal of Urban Planning and Development*.
- Erdogan, S., Welch, T., Knaap, G & Ducca, F. (2013). What to Expect In 2030: The Impacts of Fuel Prices and Fuel Efficiency on Land Use and Transportation. *Transportation Research Record: Journal of the Transportation Research Board*, 2397(1), 89-98.

Selected Recent Conference Presentations

- Welch, T., Mishra, S. (2013, November). A Framework for Determining Road Pricing Revenue Use and Its Welfare Effects. *60th Annual North American Meetings of the Regional Science Association International*. Atlanta, GA (international)
- Welch, T., Mishra, S. (2013, January). Modeling Emission Policies Through Travel Demand Mechanisms: An Analysis of the Best Reduction Strategies. *92nd Annual Meeting of the Transportation Research Board*, Washington, D.C. (National)
- Mishra, S., Welch, T. & M.K. Jha. (2013, January). Graph Theoretic Approach for Public Transit Connectivity in Multimodal Transportation Networks. *92nd Annual Meeting of the Transportation Research Board*, Washington, D.C. (National)
- Mishra, S., Welch, T. & Chakraborty, A., (2013, January). An Experiment in Mega-Regional Road Pricing Using Advanced Commuter Behavior Analysis. *92nd Annual Meeting of the Transportation Research Board*, Washington, D.C. (National)
- Mishra, S., Welch, T., Moeckel, R., Mahapatra, S., Tadayon, M. (2013, January). Development of the Maryland Statewide Transportation Model and its Application in Scenario Planning. *92nd Annual Meeting of the Transportation Research Board*, Washington, D.C. (National)
- Erdogan, S., Welch, T., Knaap, G & Ducca, F. (2013, January). What to Expect In 2030: The Impacts of Fuel Prices and Fuel Efficiency on Land Use and Transportation. *92nd Annual Meeting of the Transportation Research Board*, Washington, D.C. (National)

- Zhu, X., Mishra, S. & Welch, T., (2013, January). Framework for Modeling and Forecasting Population Age Distribution in Metropolitan Areas at Level of Transportation Analysis Zone. *92nd Annual Meeting of the Transportation Research Board*, Washington, D.C. (National)

NCSG FACULTY, RESEARCHERS AND STAFF

Tenured Faculty

Gerrit Knaap

Gerrit-Jan Knaap is Professor of Urban Studies and Planning and Executive Director of the National Center for Smart Growth Research and Education at the University of Maryland. Knaap earned his B.S. from Willamette University, his M.S. and Ph.D. from the University of Oregon, and received post-doctoral training at the University of Wisconsin-Madison, all in economics.

Knaap's research interests include the housing markets and policy, economics and politics of land use planning, the efficacy of economic development instruments, and the impacts of environmental policy. On these subjects, Knaap has published over 50 articles in journals that include the Journal of the American Planning Association, the Journal of Urban Economics, Land Economics, Regional Science and Urban Economics, Policy Analysis and Management; and State and Local Government Review. He received the Chester Rapkin award for the best paper published in Volume 10 of the Journal of Planning Education and Research, with Greg Lindsey he received the 1998 best of ACSP award, and in 2006 he received the Outstanding Planner Award from the Maryland Chapter of the American Planning Association.

Funding for his research, in excess of \$5.0 million, has been provided by the National Science Foundation, the Lincoln Institute of Land Policy, the U.S. Army Corps of Engineers, and numerous other federal, state, and local government agencies. Knaap is the co-author or co-editor of six books: Incentives, Regulations, and Plans: The Role of States and Nation States in Smart Growth Planning; Partnerships for Smart Growth: University and Community Collaboration for Better Public Places; Land Market Monitoring for Smart Urban Growth; The Regulated Landscape: Lessons on State Land Use Planning from Oregon; Spatial Development in Indonesia: Review and Prospects; and Environmental Program Evaluation: A Primer. He currently serves on the State of Maryland's Smart Growth Subcabinet, the Maryland Sustainable Growth Commission, and the Science and Technical Advisory Committee to the Chesapeake Bay Commission. He previously served on the Development Capacity Task Force appointed by former Maryland Governor Robert Ehrlich and on the Task Force on the Future of Growth and Development in Maryland appointed by Governor Martin O'Malley.

Chengri Ding

Dr. Chengri Ding is Professor at Urban Studies and Planning Program and National Center for Smart Growth, University of Maryland. He is specialized at urban economics, urban and land policies, urban planning, and China studies. He has published articles in Journal of Urban Economics, Journal of Regional Science, Urban Studies, Environment and Planning B, Housing Policy Debates, Land Use Policy. He has edited three books on China in land and housing policies, urbanization, and smart growth. Dr. Ding also has numerous publications in Chinese (manuscripts and journal articles). He has been P.I. for many international policy projects on China, ranging urban master plan, farmland protection, property taxation reform and local public financing. Reports and publications have been widely received among both high level officials and scholars. Dr. Ding has given 50+ invited or keynote speeches/presentations.

He has been consulting to the World Bank, Global Business Network, FAO, and many leading Chinese agencies such as NDRC. He serves advisory Board for the International Institute of Property Taxation. Dr. Ding is the founding director for the Lincoln Institute of Land Policy's China Program.

Hiroyuki (Hiro) Iseki

Hiroyuki is a research faculty with the National Center for Smart Growth and is Assistant Professor of Urban Studies and Planning. Iseki has recently completed a study that examines the effect of gasoline prices on transit ridership, using advanced econometric method, for which a report is forthcoming from the Mineta Transportation Institute. Iseki also completed a study of a new spatial analysis method that incorporates topography/terrain, street network, presence of intersections in the bike-shed analysis, using cyclists' energy consumption to travel as travel impedance, rather than distance or time.

Iseki is currently conducting research on: (1) the distribution of firms across the Washington DC-Maryland region in relation to Metro stations, (2) perceptions of transit service, and (3) a model to predict rail transit ridership in response to land use changes. Iseki's work has been published in a range of transportation and planning journals, including *Transportation Research Part A: Policy and Practice*, *Transport Reviews*, *Research in Transportation Economics*, *Transport Policy*, *Journal of the Transportation Research Board*, *Journal of Public Transportation*, *Computers, Environment and Urban Systems*, and *Journal of Planning Education and Research*.

Casey Dawkins

Casey Dawkins is an Associate Professor of Urban Studies and Planning, Research Associate with the National Center for Smart Growth, and Director of the Center's Housing Strategies Group. Prior to joining the University of Maryland, Dr. Dawkins was an Associate Professor of Urban Affairs and Planning, Director of the Metropolitan Institute, Director of the Center for Housing Research, and Editor of the journal *Housing Policy Debate* at Virginia Tech.

His current research focuses on U.S. housing policy evaluation; metropolitan housing market dynamics; the causes, consequences, and measurement of residential segregation by race and income; affordable housing and transit-oriented development; and the link between land use regulations and housing affordability. He has written two books and over 30 refereed journal articles and book chapters on these topics. Dr. Dawkins was co-guest editor of two special issues of *Urban Geography* focusing on the measurement of residential segregation and neighborhood change and currently serves on the editorial advisory boards of the *Journal of the American Planning Association* and *Housing Policy Debate*.

Dr. Dawkins' research has been supported by funding from a variety of organizations, including the U.S. Department of Housing and Urban Development, U.S. Environmental Protection Agency, U.S. General Services Administration, Fannie Mae Foundation, Brookings Institution, National Association of Realtors, Center for Housing Policy, Ewing Marion Kauffman Foundation, and several other governmental, private, and nonprofit organizations within Virginia, Maryland, and the District of Columbia.

Senior Researchers

Uri Avin

Uri Avin is Research Professor and Director of the Planning and Design Center (PDC) at the National Center for Smart Growth at the University of Maryland. Uri's 42 years of experience span both the public and private sectors. Prior to his appointment at UMD, Uri was the Practice Leader for Regional Growth Management with the large international infrastructure consulting firm of Parsons Brinckerhoff (PB). Before joining Parsons Brinckerhoff, Uri was a Vice President with HNTB, a large, national planning, architecture and engineering firm. Prior to its acquisition by HNTB in 2000, Uri was a principal with LDR International, a 50-person planning/urban design and landscape architecture firm with a national portfolio and reputation. During the decade of the 80s he served as a planning director or deputy director in three Maryland counties – Howard, Baltimore and Harford - where his innovative Smart Growth plans earned him national recognition.

Uri's work has received 9 national and 21 state awards. His articles and papers are widely cited, he is a regularly featured speaker at national conferences and has also keynoted numerous conferences on Smart Growth and the land use/transportation connection. He served on the Board of the Center for Watershed Protection and on the Maryland's Climate Change Commission, Greenhouse Gas and Carbon Mitigation Work Group. He serves as an Associate Editor for the Journal of the American Planning Association and of the Fifth Edition of The Practice of Government Planning. He is also a member of the Transportation Research Board's Committee on Transportation and Land Development and served on the Technical Committee of AMPO.

Within the URSP program at UMD, he teaches courses on Land Use Planning and The Planning Process. His current focus is on regional scenario building, growth management and the land use/transportation/emissions interface.

Fred Ducca

Dr. Fred Ducca has more than 30 years of experience in research, development, deployment and training in travel forecasting methods and procedures. Dr. Ducca currently directs the Transportation Policy and Research Group (TPRG) at the National Center for Smart Growth (NCSG). Under Dr. Ducca's management, the TPRG has developed the Maryland Statewide Transportation Model (MSTM) for the Maryland State Highway Administration (SHA) and continues to make improvements to the model. During the past year the TPRG completed a proof of concept for the application of Dynamic Traffic Assignment methods to statewide transportation models in Maryland. This work was sponsored by the Maryland State Highway Administration and the Federal Highway Administration. The TPRG also began an analysis of freight movements and commodity flows within Maryland for the Maryland Department of Transportation (MDOT). The TPRG has also conducts research for the Maryland Department of Environment (MDE) and the Town Creek foundation.

In addition to foster international exchange, the TPRG hosted a joint seminar featuring Tongji University and Beijing University of Technology to discuss transportation projects and research.

Prior to joining the NCSG Dr. Ducca managed the FHWA Travel Model Improvement Program (TMIP). This program advanced both the state of the art and state of the practice in travel forecasting by sponsoring the development of new methods and providing training in the new techniques. In addition selected early adopters of the advanced techniques were provided financial assistance to learn and apply the techniques.

Associate Researchers

Chao Liu

Dr. Liu is a Faculty Research Associate at the National Center for Smart Growth Research and Education (NCSG) at the University of Maryland. Her research is concentrated in transportation planning, sustainable land use and transportation policy, transportation energy and emission modeling, as well as the applications of GIS and statistical models in these fields.

Dr. Liu is playing a key leading role in multiple projects at NCSG including Sustainable and Equitable Economic Development (SEED) Initiative of Maryland, Sustainable Community Initiative (Baltimore Opportunity Collaborative) for BMC, Transportation Place Types for MDOT, and Transit Direct Ridership Model for MDOT and WMATA. Dr. Liu's work has been published in several peer-reviewed journals including: Computer, Environment and Urban Systems, Transportation Research Record, Sustainability, International Journal of Environmental Science and Technology, and Transportation Research part D.

Dr. Liu and her colleague, Eli Knaap, developed a new course: URSP 688L Planning Technologies in Spring 2013. This MOOC-style online course provides an introduction of several basic technologies needed by planners including GIS, blogs, social networking tools, video sharing, and online surveys. Dr. Li and Eli Knaap also co-developed a new course: URSP688M Intermediate GIS in Spring 2014. This course covers a wide range of knowledge including modeling various analyses, spatial statistics, network analysis, programming skills, and expertise in using CommunityViz.

Sevgi Erdoğan

Sevgi Erdoğan is Faculty Research Associate at the National Center for Smart Growth Research and Education (NCSG) at the University of Maryland. Her research interests span a wide range of areas in transportation engineering and planning including: modeling and optimization of transportation networks, dynamic traffic assignment methodology and its applications, advanced travel demand modeling, integrated transportation-land use planning, transportation policy and smart growth, travel demand management strategies with emphasis on congestion pricing, and emissions reduction strategies.

At NCSG, Dr. Erdoğan conducts research for various projects such as development of a proof of concept dynamic statewide transportation model for the state of Maryland, developing local methods for modeling, economic evaluation, justification and use of the value of travel time reliability in transportation decision making, and Maryland Scenarios Project. Her research was

presented at several conferences and published in peer-reviewed journals such as Transportation Research Part -C and -E, EJOR, TRR and IJST. She recently joined to the editorial advisory board of the journal Transportation Research Part E: Logistics and Transportation Review with a 3-year term (2015-2017) and serves as reviewer for 7 academic journals. She received WTS (Women in Transportation Seminar) DC Chapter Doctoral Student Scholarship in 2007.

Rolf Moeckel

Rolf Moeckel is a faculty research assistant at NCSG. His main interest is to understand how computer modeling may support urban and regional planning. Rolf has developed and implemented three land-use models and continues researching how to integrate such models with travel demand models to represent the land-use/transportation feedback cycle. Rolf also has worked on eight statewide models in the United States, and is one of the key architects of the Maryland Statewide Transportation Model. Additionally, he has analyzed the impact of spatial resolution on modeling performance and has extensively compared microscopic with aggregate models.

Prior to joining the National Center for Smart Growth, Rolf worked with the consulting firm Parsons Brinckerhoff, where he developed a wide range of models, including activity-based, mode choice, land use, and freight models.

Currently, Rolf is implementing the land use model SILO with the transportation model MSTM to fully represent the land-use/transportation feedback cycle. Once this integration succeeded, this suite will be further integrated with environmental impact models in the PRESTO project and with a climate change model in the SESYNC project. Rolf is also working on a freight modeling framework for the TRIAD metropolitan area of Greensboro, NC. This model will capture long-distance freight in a commodity-flow model and short-distance truck trips in a tour-based truck model.

Visiting Researchers

Wenbo Fan

Wenbo Fan joined NCSG as a visiting scholar to conduct park-and-ride planning research for the state of Maryland. Dr. Fan is currently working on a project of evaluating the environmental impacts of highway extension in Frederick, Maryland. His research interests also include transit-oriented development, value/congestion pricing, and tradable mobility credits in congestion management. Prior to working with NSCG, he taught classes and conducted research for four year at Southwest Jiaotong University in China. In 2013, he visited George Mason University for a short-term academic communication program.

Dr. Fan has presided over a number of transportation planning projects in China, which were funded by the cities of Chengdu, Leshan, and Pengzhou. Dr. Fan has published approximately 20 research papers in the field of transportation demand management. Dr. Fan is a committee board member of Modern Traffic and Transportation Engineering Research, and a peer

reviewer of various international journals including Transportation Research Part A: Policy and Practice, Advances in Transportation Studies, Journal of Modern Transportation, Journal of Transportation technologies, Modern Traffic and Transportation Engineering Research, and Proceedings of East Asian Society for Transportation Studies (2013).

Harutyun Shahumyan

Dr. Harutyun Shahumyan has over 12 years of experience specializing in Geographic Information Systems (GIS), geo-spatial analysis and modelling, data analysis and data management with a focus on land use, urban modelling, cellular automata and spatial decision supporting systems. After gaining MS degree in Applied Mathematics and PHD in Engineering in Armenia Harut did academic scholarship in the University of Cambridge visiting it periodically during the period of 2002-2005. Meanwhile he started to work as a GIS Consultant in different leading international organizations including USAID, Emerging Markets Group, PA Consulting and Development Alternatives Inc. Started from 2008 Dr. Shahumyan works in the University College Dublin as a Post Doctoral Researcher. He is an author of more than 20 research papers and is a reviewer of European Science Foundation.

Harut has joined to the National Center for Smart Growth Research and Education in August of 2014 to carry on his research project GeoSInPo in scope of recently granted EU FP7 Marie Curie International Outgoing Fellowship. Here he continues his work in a multi-disciplinary team of researchers on application of geospatial modelling to support policy makers. His main research is focused on integration of different models (land use, transportation, emission, water quality, etc.) using various coupling methods (e.g. OpenMI). As part of his Marie Curie fellowship Dr Shahumyan will return to University College Dublin in August 2016 to implement his acquired knowledge and experience in Ireland.

Staff

Jason Sartori

Jason Sartori is a contractor to the NCSG currently serving in the role of Associate Director. Jason obtained his Master of Community Planning degree from the University of Maryland's School of Architecture, Planning and Preservation, where he specialized in economic development. His Bachelor of Arts degree in economics and political science comes from the University of Richmond. Over the last 17 years, Jason has managed a variety of stakeholder participation, strategic planning and research initiatives for corporations in the private sector, government agencies, and non-profit organizations. Since publication of the last NCSG progress report, Jason has managed several Center projects, including the SEED Initiative, the STAR Project, and an opportunity mapping effort for Baltimore Opportunity Collaborative. He also organized the MM2: Moving Forward Montgomery conference with the Montgomery Planning Department and the first Central Maryland Local Government Exchange in conjunction with the American Planning Association. Jason's continues to play a key role on the Center's SEED Initiative reporting efforts, the Center's involvement with the Opportunity Collaborative, and creation of the online opportunity mapping tool, OppMap.

Kim Ross

Kimberly M. Ross is a consultant currently serving as Assistant Director for the National Center for Smart Growth Research and Education at the University of Maryland where she conducts fundraising and proposal development, provides management consulting and helps to incubate new programs, and develops workshops. Her current work is focused on the Purple Line Corridor Coalition to help future investments in the Purple Line light rail corridor achieve the maximum possible economic, social and environmental benefits to the residents and businesses.

With over twenty years of management experience (fourteen at UMD), Ross has led the strategic design and implementation of highly-valued information services, partnerships, and research organizations. Throughout her eight years of public service at the national level, Ross served in a variety of roles with the White House Domestic Policy Office, the White House Office of Intergovernmental Affairs, and the US Department of Education – in the Office of Intergovernmental, Interagency and International Affairs; and the Division of Community Services and Partnerships. Ross holds a MPP in Environmental Policy from the Maryland School of Public Policy and a B.A. in Business Administration from Rhodes College in Memphis, Tennessee.

Emily Tettelbaum

Emily Tettelbaum works remotely as a consultant for the Montgomery County Planning Department. She was a key member of the team that drafted the County's new zoning ordinance and updated the corresponding zoning map. The new zoning ordinance and zoning map, which were adopted by the County Council in 2013, help implement the County's smart growth and sustainability goals. Emily continues to work closely with Planning Department staff, developers, attorneys, and residents to help them understand and use the new zoning code. She holds a Master of Community Planning degree from the University of Maryland.

Jennifer Wise

Jennifer Wise is a research associate at the National Center for Smart Growth. As a research associate, she is currently working on the zoning code rewrite project for the Montgomery County Planning Department. Jennifer holds a Master of Community Planning degree from the University of Maryland. She also holds a Bachelor of Business Administration degree from Emory University, with concentrations in marketing and consulting.

Matt Johnson

Matt Johnson is a Research Associate at the National Center for Smart Growth and is under contract to the Montgomery County Planning Department of the Maryland-National Capital Park and Planning Commission. Prior to joining the National Center for Smart Growth, Matt worked on Human Services Transportation and public involvement at the Atlanta Regional Commission. He serves on the editorial board of Greater Washington. He is a member of the American Institute of Certified Planners. His current work involves planning initiatives in Montgomery County, including an update to the county's Bicycle Master Plan and the new digital zoning map. He holds a Master of Community Planning from the University of Maryland and a Bachelor of Science in Public Policy from the Georgia Institute of Technology.

Ph.D. Students

Eli Knaap

Eli Knaap is a PhD candidate in Urban Studies at the University of Maryland. He also runs the spatial research lab at the National Center for Smart Growth and serves on the steering committee of the Open Planning Tools Group. His research focuses on Neighborhood Effects, urban analytics, and spatial models of socioeconomic mobility. Eli holds a B.A. in sociology and a Master of Community Planning from the University of Maryland.

Ting Ma

Ting Ma is a third-year Urban Planning Ph.D. student at the University of Maryland, College Park, and a research assistant at the National Center for Smart Growth. Ting has studied urban planning and design for ten years, part of which was a five year undergraduate degree in architecture and urban design. She has an integrated knowledge of the application of planning principles to physical design. Ting has extensive experience with urban design and urban planning at various scales in both China and U.S. In urban design, Ting specializes in creating healthy and sustainable places by connecting to public transportation, mixing land use, introducing green technologies, systemizing public open space, and being responsive to the cultural context and demographic/economic change. Ting is well versed in design tools such as ArcGIS, AutoCAD, Photoshop, InDesign, Illustrator, CorelDraw, and Sketchup. Most recently, her work at the NCSG has included researching and testing development categories (PlaceTypes) for classifying development in Maryland for the MDOT so as to facilitate place-directed policies.

Jae Sik Jeon

Jae Sik Jeon is a Ph.D. student in Urban and Regional Planning and Design program. He originally comes from Seoul, Republic of Korea and holds a B.S. and a M.S. in Urban Planning and Engineering from Yonsei University. Before coming to Maryland, he worked at Korea Research Institute for Human Settlements as a research assistant. As a research assistant of NCSG, He is currently working on a project of evaluating the market impacts of Montgomery County's Moderately Priced Dwelling Unit (MPDU) program. His academic interest includes the impacts of housing policy on neighborhood choice, the relationship between land use and affordable housing, and dynamics of neighborhood sustainability.

Rob Jones

Robert Jones is originally from Buffalo, New York. He received a Bachelor of Arts in Environmental Design degree before obtaining a Master of Urban Planning degree (with a specialization in Environmental and Land Use Planning), both from the State University of New York at Buffalo. He is currently a student in the doctoral program at the University of Maryland and works with Dr. Hiro Iseki. His work is focused on issues of transportation economics, finance and pricing, and their relationship with equity concerns.

Prior to enrolling as a doctoral candidate at the University of Maryland, Rob spent over four years working as a transportation planner for a small consulting firm based in Colorado Springs, Colorado. During his time as a consultant he had the opportunity to work on numerous studies that incorporated all aspects of transit service planning and analysis. Additionally, he had the

opportunity to work on national projects such as “TCRP Report 161: Methods for Forecasting Demand and Quantifying Need for Rural Passenger Transportation.” During his time as a research assistant at the National Center for Smart Growth Research and Education (NCSG), he have been involved in several research projects examining the WMATA service area.

Yuchen Cui

A native of Xi'an, China, Yuchen earned her bachelor's degree in Civil Engineering from Tongji University in Shanghai, China and master's degree in Civil and Environmental Engineering from the University of Wisconsin-Madison. She entered the Urban and Regional Planning and Design Ph.D. program and joined the National Center for Smart Growth Research and Education in 2012. She works closely with the State Highway Administration and Parsons Brinckerhoff in the development of Maryland Statewide Transportation Model. For research, she is developing a method to define the spatial resolution of transport network and its implementation in travel demand models.

Tim Welch

(now Assistant Director of Georgia Tech's Center for Quality Growth)

Tim Welch is an Assistant Professor of transportation planning in the School of City and Regional Planning and the Assistant Director of the Center for Quality Growth and Regional Development at Georgia Tech. He is an expert in transportation, freight and emissions modeling with an extensive background in transportation related research. Dr. Welch provided research assistance on numerous projects as a Faculty Research Associate at the National Center for Smart Growth including ongoing development and management of the Maryland Statewide Transportation Model and many other projects sponsored by the Maryland DOT, Department of Environment, Department of Planning and Federal Highway Administration. Dr. Welch's current research focuses on transportation systems analysis, with extensive work in developing travel demand and emissions forecasting models and finding new and innovative ways to apply models to urban problems. Dr. Welch is the author of over forty-five articles in refereed journals, book chapters, and conference proceedings. He serves as a member of the Transportation Research Board's Transportation and Air Quality (ADC20) and Freight Economics and Regulation (AT010) committees.

Dr. Welch holds bachelor's degrees in Finance and Business administration from Washington State University, a master's in Urban and Regional Planning from Florida State University, a JD from the University of Detroit, an LL.B from the University of Windsor and a Ph.D. in Urban Planning from the University of Maryland College Park.

EFC Staff

Lauralee Barbaria

Ms. Barbaria joined the Environmental Finance Center (EFC) at the University of Maryland in July of 2014. Lauralee serves as the Associate Director for the Environmental Finance Center West, at Dominican University of California. She was a past Director of Dominican's Green MBA program. Her executive management and leadership experience gathered from 25 years in the financial, hi-tech and health care industries reflect her success as a change agent working with

diverse groups of all sizes, to identify and implement leadership techniques and strategies to build capacities and partnerships for complex challenges. Lauralee has provided leadership workshops and executive coaching internationally and throughout the United States. At the local level, Lauralee provided training seminars to the Native American Environmental Protection Coalition of 20 tribes to start their balanced scorecard strategic plan to support Tribal water, integrated waste management plans and environmental initiatives. Most recently Lauralee has provided training at the University of Buenos Aires focusing on the business case to integrate Corporate Social Responsibility into organization, as well as presentations on climate change impacts on supply chains and risk mitigation.

Monica Billig

Ms. Billig joined the Environmental Finance Center (EFC) in August 2010 as a program/graduate assistant at the beginning of her graduate school career at the University of Maryland. Since she received her Master in Public Policy at the University of Maryland in May 2012, Ms. Billig joined the EFC full time as a Program Manager and is opening up a Pennsylvania satellite program office, located in Lancaster, PA. In this role, Ms. Billig is working with communities in Pennsylvania to help finance environmental and sustainable development initiatives. Prior to joining EFC, Ms. Billig worked for two years as a Research Associate at edCount, LLC, a Washington, DC based education policy consulting firm specializing in policy related to assessments, standards, and accountability.

Medessa S. Burian

Ms. Burian joined the EFC in 2011 to manage the Mid-Atlantic Dray Truck Replacement Program. Ms. Burian also manages an EPA funded Green and Healthy Schools project and provides support to other Center programs with a particular focus on public health. Prior to joining EFC Ms. Burian worked as a Project Director for Shattuck & Associates, Inc. for five years performing technical assistance, training, capacity building, and practical evaluation for government and non-governmental health and education organizations.

Jennifer Cotting

Ms. Cotting joined the Environmental Finance Center (EFC) at the University of Maryland in 2004 to manage an EPA funded program designed to help communities and organizations in Region 3 overcome barriers to implementing and financing their watershed protection efforts. As a Program Manager she coordinated a number of the EFC's core programs, with a particular focus on urban greening, tree canopy, and green infrastructure. Her current work as Assistant Director includes these program management tasks, as well as responsibilities for the day-to-day operations of the center and the management of staff and student employees. In addition, Ms. Cotting serves as the EFC's representative to the Green Infrastructure Community of Practice, and is a green infrastructure financing instructor for the Conservation Fund's course *Strategic Conservation Using a Green Infrastructure Approach*. Prior to joining the EFC, Ms. Cotting worked as an independent consultant developing and implementing environmentally based education and outreach programs for nonprofit organizations and government agencies.

Sarah Diefendorf

Ms. Diefendorf joined the Environmental Finance Center (EFC) at the University of Maryland in the fall of 2012 as Senior Associate for International Programs. She also serves as Executive Director of the Environmental Finance Center at Dominican University of California. In that capacity, Sarah's work includes assisting the Navajo, Apache, Yurok and other Native American tribes in Arizona, California and Nevada in promoting sustainable enterprise and improving their capacity for grassroots development. Ms. Diefendorf also directed the team that prepared a Guidebook on International Environmental Finance for the United Nations Development Program.

From 2004 – 2008, she served as vice president for the League of Women Voters of the United States (LWVUS). Since 2001, Ms. Diefendorf has worked as a Grassroots Democracy Trainer for the LWVUS and has worked on capacity building with women's organizations in Ethiopia, Zimbabwe, Nigeria, Armenia and Jamaica. Other international work includes developing and leading training workshops on Leadership, Sustainable Enterprise and Grassroots Advocacy in South Africa, the Democratic Republic of the Congo, and Thailand. Currently she is participating as a trainer and facilitator for the LWVUS and US State Department Broader Middle East and North Africa (BMENA) initiative.

Mike Hunninghake

Mike joined the EFC in 2013 to manage the Sustainable Maryland Communities program and assist with the Maryland Smart Energy Communities program. Prior to joining EFC, Mike was the Director of Communications & Education at Pinelands Preservation Alliance (PPA), a state-wide non-profit environmental organization whose mission is protecting and preserving over 1 million acres of the New Jersey Pinelands. In that capacity he also served as a member of the New Jersey Pinelands Commission's Educational Advisory Council and the Barnegat Bay Partnership's Communication and Education Committee. Mike was also the founding Chair of a municipal Environmental Commission and a Planning & Zoning Board member in New Jersey, and as a Green Team co-Chair led his town to a Sustainable Jersey certification and a "Sustainable Champion" Award for Small Communities.

Jill Jefferson

Jill Jefferson, Program Manager for Sustainable Agriculture, joined the Environmental Finance Center (EFC) March 2013. Jill is focused on raising awareness of sound land use practices to improve water quality through local food initiatives, manure to energy projects, agricultural best management practices, and other innovative projects. Her goal is use her scientific background and facilitation experience to collaboratively assist communities, organizations, and farmers in achieving local priorities and meeting environmental mandates in a fiscally-sound manner. Jill offers extensive knowledge of local government having spent five years with a regional planning commission managing water supply planning and infrastructure, natural hazard mitigation planning and vulnerability analyses (from hurricanes, earthquakes, etc.), solid waste planning, and Bay TMDL watershed modeling and planning. Previous work experience also includes Of the Salt of The Earth president, providing environmental consulting to local governments and school; environmental impact statement preparation and extensive public

outreach through Navy and other contractors; and early work at US EPA Region II in air sampling and hazardous waste.

Brent McCloskey

Brent McCloskey joined the Environmental Finance Center (EFC) in November 2012 as a Research Associate working to advance public/private partnerships at the community level throughout the mid-Atlantic region. He is also working to advance EFC's role at the international level. Prior to joining EFC, he was the Associate Director for Restoration Financing and Policy at the Maryland Department of Natural Resources (DNR). During his tenure at DNR, he served as policy advisor to the Governor's Bay Cabinet and Governor's Bay Workgroup, directing policy and program actions relating to water quality issues in the Chesapeake Bay. Mr. McCloskey also coordinated and directed Maryland's flagship local government environmental assistance program – the Watershed Assistance Collaborative. In addition, he oversaw the management and distribution of state special funds directed towards non-point source water quality improvement projects. Prior to joining DNR, Mr. McCloskey spent two years with EPA's Chesapeake Bay Program Office in Annapolis, Maryland working on water quality issues.

Dan Nees

Dan Nees recently rejoined the Environmental Finance Center (EFC) as a Senior Research Associate. Prior to returning to EFC, he led environmental market and water quality programs at Forest Trends, a global NGO that seeks to develop market and economic solutions to global environmental problems. Prior to joining Forest Trends, Dan led water quality programs at the World Resources Institute (WRI), an environmental think-tank located in Washington, DC. Dan first joined the Environmental Finance Center in 1998 as a graduate intern, and eventually assumed the role of Director. During his tenure with EFC, Dan has assisted communities throughout the Chesapeake Bay watershed and the Mid-Atlantic region in their efforts to implement and finance environmental and sustainable development initiatives. Dan's work currently focuses on developing innovative market and performance-based financing systems to reduce the cost of environmental compliance at local, state, and regional levels.

Eric Reed

Eric Reed joined the Environmental Finance Center in the fall of 2012 as a Research Associate for Fiscal and Financial Analysis. Eric's focus is on financial analysis to support the development of efficient, effective, and sustainable financing strategies for addressing resource management issues. He is involved with the development of a cohesive water infrastructure financing program that supports and expands the capacity of the EFC's Stormwater Financing and Outreach Unit and EFC's Water Systems Financing Unit. Eric also supports projects in which analysis can improve infrastructure asset management and the return on investments in sustainable projects.

Prior to joining EFC, Eric's professional experience included performing financial analysis of green infrastructure projects; developing environmental market accounting standards; modifying LCA models for construction projects to determine carbon emissions; performing financial and community impact analysis of real estate

developments; structuring development and infrastructure project financing; underwriting environmental insurance; managing environmental insurance claims and pollution remediation projects; and work at the European Commission of Human Rights.

Joanne Throwe

Joanne Throwe is the Director of EFC. She joined the Center in 2005 and has served in several positions starting as an Agricultural Program Leader, Assistant Director (2007), Associate Director (2008), and Director (2009). She brings over 26 years of technical experience in areas related to finance and natural resource protection. Joanne has overseen the development of several successful new programs for the Mid-Atlantic including Sustainable Maryland Certified, the Mid-Atlantic Dray Truck Replacement Program and the Stormwater Financing and Outreach Unit. During her time with EFC, she also completed an 18-month assignment working with USDA/NIFA on a shared faculty assignment to coordinate special agriculture projects including in the area of water reuse and ecosystem services. Her experience includes extensive knowledge about stormwater, agriculture, energy, transportation, and solid waste management. Prior to joining the UMD EFC, Throwe spent several years as a Development Resource Specialist at USDA's Foreign Agriculture Service and two years as an Agriculture Extension Agent for Peace Corps in the South Pacific.

Sean Williamson

Sean Williamson joined the EFC in 2012 and manages energy and climate change work. Sean is actively involved in the Maryland Smart Energy Communities program, University System of Maryland greenhouse gas analysis, and stormwater projects for the Center. Prior to joining EFC, Sean worked at the Center for Integrative Environmental Research at the University of Maryland for three years where he researched renewable energy, greenhouse gas reduction policies, and ecological economics. Sean strives to make data-driven decision-making and clear communication the central components of his work with communities and stakeholders.

Administrative Staff

Cynthia Williams

Cynthia Williams is the grants contracting officer for the National Center for Smart Growth and School of Architecture Planning and Preservation. She has worked in this capacity since 2008. Ms. Williams has worked for the University of Maryland for 19 years as an accountant in the Contract Grant Accounting Office (2005-2008); business service specialist in the Department of Criminology and Criminal Justice (1999-2005); manager of operational accounting and staff accountant at the Center for Institutional Reform (1994-1999). Ms. Williams has a Bachelor's Degree from the University of Maryland University College.

Toni Ames

Toni Ames began her employment with the Environmental Finance Center as an Office Manager and Program Assistant in late 2011. She assists in the management of the Mid-Atlantic Regional Dray Truck Replacement Program, as well as in the planning and organization of the Center's day-to-day operations. Her previous experience focused on office management,

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Alyson D'Apice

Alyson D'Apice works as an Accounting Associate for the National Center for Smart Growth and School of Architecture Planning and Preservation. She began work at the University of Maryland in March of 2013. She assists the research coordinator and performs administrative duties for the center.