

## **PERSONAL INFORMATION**

David Newburn  
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### **Academic Appointments at UMD**

Associate Professor, Department of Agricultural and Resource Economics, University of Maryland, College Park, 2018-present.

Assistant Professor, Department of Agricultural and Resource Economics, University of Maryland, College Park, 2012-2018.

### **Other Employment**

Assistant Professor, Department of Agricultural Economics, Texas A&M University, 2006-2011.

Ciriacy-Wantrup Postdoctoral Fellow, Department of Agricultural and Resource Economics, University of California, Berkeley, 2003-2005.

Smithsonian Institute/Man & the Biosphere Program, Intern, Washington, DC, 1995-1996.

Conservation International, Policy Analyst, Washington, DC, 1995.

National Renewable Energy Laboratory, Consultant, Washington DC, 1995.

United States Department of Agriculture, Research Technician, Beltsville, MD, 1994.

WorldTeach/Namibia, Secondary School Teacher, Nkurenkuru, Namibia, 1992-1994.

### **Educational Background**

Ph.D. University of California, Berkeley. Environmental Science, Policy and Management, 2002.

B.S. University of Maryland, College Park. Physics (high honors in physics), 1991.

## **RESEARCH, SCHOLARLY, AND CREATIVE ACTIVITIES**

### **Referred Journal Articles**

# mentored student

Fleming#, P., E. Lichtenberg, and D. Newburn. 2020. "Water quality trading in the presence of conservation subsidies." *Land Economics*, 96(4): 552-572.

- Wrenn, D, A. Klaiber, and D. Newburn. 2019. "Price-based policies for managing residential development and impacts to water quality." *Resource and Energy Economics*, 58: 101115.
- Fleming#, P., E. Lichtenberg, and D. Newburn. 2018. "Evaluating impacts of agricultural cost sharing on water quality: additionality, crowding in, and slippage." *Journal of Environmental Economics and Management*, 92: 1-19.
- Newburn, D. and J. Ferris#. 2017. "Additionality and forest conservation regulation for residential development." *American Journal of Agricultural Economics* 99(5): 1228-1245.
- Wrenn, D, A. Klaiber, and D. Newburn. 2017. "Confronting price endogeneity in a duration model of residential subdivision development." *Journal of Applied Econometrics* 32:661-682.
- Ferris#, J. and D. Newburn. 2017. "Wireless alerts for extreme weather and the impact on hazard mitigation behavior." *Journal of Environmental Economics and Management* 82: 239-255.
- Newburn, D. and A. Alberini. 2016. "Household response to environmental incentives for rain garden adoption." *Water Resources Research*, 1345-1357.
- Newburn, D. and J. Ferris#. 2016. "The effect of downzoning for managing residential development and density." *Land Economics* 92(2): 220-236.
- Woodward, R., D. Newburn, and M. Mezzatesta#. 2016. "Additionality and reverse crowding out for pollution offsets in water quality trading." *Ecological Economics* 128: 224-231.
- Grantham, T., M. Mezzatesta#, D. Newburn, and A. Merenlender. 2014. "Evaluating tradeoffs between environmental flow protections and agricultural water security." *River Research and Applications* 30: 315-328.
- Mezzatesta#, M., D. Newburn, and R. Woodward. 2013. "Additionality and the adoption of farm conservation practices." *Land Economics* 89(4): 722-742.
- Newburn, D. and R. Woodward. 2012. "An ex post assessment of the Great Miami River Water Quality Trading Program." *Journal of the American Water Resources Association* 48(1): 156-169.
- Grantham, T., D. Newburn, M. McCarthy, and A. Merenlender. 2012. "The role of stream flow and land use on limiting oversummer survival of juvenile steelhead in California streams." *Transactions of the American Fisheries Society* 141: 585-598.
- Newburn, D. and P. Berck. 2011. "Exurban development." *Journal of Environmental Economics and Management* 62: 323-336.
- Newburn, D., N. Brozovic, and M. Mezzatesta#. 2011. "Agricultural water security and instream flows for endangered species." *American Journal of Agricultural Economics* 93(4): 1212-1228.

Newburn, D. and P. Berck. 2011. "Growth management policies for exurban and suburban development: Theory and an Application to Sonoma County, California." *Agricultural and Resource Economics Review* 40(3): 375-392.

Irwin, E., K. Bell, N. Bockstael, D. Newburn, M. Partridge, and J. Wu. 2009. "The economics of urban-rural space." *Annual Review of Resource Economics* 1: 435-459.

Merenlender, A., D. Newburn, S. Reed, and A. Rissman. 2009. "The importance of incorporating threat for efficient targeting and evaluation of conservation investments." *Conservation Letters* 2: 240-241.

Lohse, K.A., D.A. Newburn, J.J. Opperman, and A.M. Merenlender. 2008. "Forecasting relative impacts of land use on anadromous fish habitat to guide conservation planning." *Ecological Applications* 18(2): 467-482.

Newburn, D.A., P. Berck and A.M. Merenlender. 2006. "Habitat and open space at risk of land-use conversion: targeting strategies for land conservation." *American Journal of Agricultural Economics* 88(1): 28-42.

Newburn, D.A. and P. Berck. 2006. "Modeling suburban and rural residential development beyond the urban fringe." *Land Economics* 82(4): 481-499.

Newburn, D., S. Reed, P. Berck, and A. Merenlender. 2005. "Economics and land-use change in prioritizing private land conservation." *Conservation Biology* 19(5): 1411-1420.

Gong, P., S.A. Mahler, G.S. Biging and D.A. Newburn. 2003. "Vineyard identification in an oak woodland landscape with airborne digital camera imagery." *International Journal of Remote Sensing* 24(6): 1303-1315.

### **Working Papers**

"Household willingness to pay for stream restoration on private and public lands: Evidence from the Baltimore Metropolitan Region." (Revise and Resubmit, *Water Resources Research*, Andrew Rosenberg and Charles Towe)

"Modeling transaction costs within household adoption behaviors." (with Rob Johnston and Tom Ndebele)

### **Book Chapters**

Newburn, D., L. Lynch, and H. Wang#. 2021. "Farmland and forest conservation." G. Knaap et al. (eds.), *Handbook on Smart Urban Growth*. Elgar Publishing

Irwin, E.G., G. Buckley, M. Gnagey, N. Irwin, D. Newburn, E. Pierce, D. Wrenn and W. Zhang. 2019. "The role of regulations and norms in land use change." S. Pickett et al. (eds.), *Science for*

*the Sustainable City: Empirical Insights from the Baltimore School of Urban Ecology*. New Haven: Yale University Press.

## **Published Conference Proceedings**

### *Refereed Conference Proceedings*

Berck, P. and D.A. Newburn. 2007. "The importance of sewer extension costs for determining the value of future development on agricultural lands." *Review of Agricultural Economics* 29(3): 510-517. (editor-reviewed) Presented at the Allied Social Sciences Associations Annual Meeting, Chicago, Illinois.

## **Conferences, Workshops, and Talks**

### *Invited Talks*

Fleming, P., E. Lichtenberg, and D. Newburn. 2018. "Water quality trading in the presence of existing cost share programs: Implications for water quality management in the Chesapeake Bay." George Perkins Marsh Institute, Clark University.

Newburn, D. 2015. "Additionality and forest conservation regulations for residential development." Department of Agricultural Economics, Sociology and Education. Pennsylvania State University.

Ferris, J. and D. Newburn. 2014. "Residential development and the effect of competing forest conservation policies." Land Use and Ecosystem Service Provision Workshop, University of California, Santa Barbara, California.

Ferris, J. and D. Newburn. 2014. "Maryland's Forest Conservation Act and the impact on residential development and forest cover change." Department of Agricultural, Food, and Resource Economics, Rutgers University, New Brunswick, New Jersey.

Newburn, D. 2012. "Residential development in the Baltimore Region." Center for Urban Environmental Research and Education. University of Maryland at Baltimore County, Baltimore, Maryland.

Newburn, D. 2011. "Agricultural water security and instream flows for endangered species." Department of Natural Resource and Environmental Management. University of Hawaii, Honolulu, Hawaii.

Newburn, D., N. Brozovic, and M. Mezzatesta. 2009. "Agricultural water security, compliance, and instream flows." Heartland Workshop in Environmental and Resource Economics, University of Illinois, Urbana, Illinois.

Newburn, D., and P. Berck. 2009. "Spatial dynamic model of exurban development." Environmental Protection Agency sponsored workshop on The Economics of Land-Use Change: Advancing the Frontiers, Washington, DC.

Newburn, D. 2009. "Leapfrog development in the urban-rural interface." Department of Agricultural, Environmental, and Development Economics, Ohio State University, Columbus, Ohio.

Newburn, D. 2008. "Spatial modeling of exurban development." Department of Agricultural and Resource Economics, Colorado State University, Fort Collins, Colorado.

Newburn D. 2006. "Spatial targeting strategies for land conservation." Department of Agricultural Economics. Texas A&M University, College Station, Texas.

Newburn D. 2006. "Habitat and open space at risk of land-use conversion." Department of Agricultural and Resource Economics. Oregon State University, Corvallis, Oregon.

Newburn, D. and P. Berck. 2005. "Habitat and open space at risk of land-use conversion." Association of Environmental and Resource Economics Summer Workshop: Natural Resources at Risk. Grand Tetons, WY.

Newburn, D. 2001. "Spatial economic models of deforestation." VIII Interamerican Congress on the Environment. Talca, Chile.

#### *Refereed Presentations*

Ndebele, T., R. Johnston, and D. Newburn. 2020. "Transaction costs and household adoption of stormwater management practices." Agricultural and Applied Economics Association Conference. Kansas City, Missouri (virtual).

Fleming, P., E. Lichtenberg, and D. Newburn. 2018. "Evaluating impacts of agricultural cost sharing on water quality: Additionality, crowding in, and slippage." World Congress of Environmental and Resource Economists. Gothenburg, Sweden.

Wrenn, D., H.A. Klaiber, and D. Newburn. 2018. "Price-based policies for managing residential development and impacts to water quality." Agricultural and Applied Economics Association Conference. Washington, DC.

Fleming, P., E. Lichtenberg, and D. Newburn. 2018. "Water quality trading program design with heterogeneous behavioral responses." Agricultural and Applied Economics Association Conference. Washington, DC.

Rosenberg, A., D. Newburn, and C. Towe. 2018. "Household willingness to pay for stream restoration on private and public lands: Evidence from the Baltimore Metropolitan Region." Agricultural and Applied Economics Association Conference. Washington, DC.

Lichtenberg, E., H. Wang and D. Newburn. 2018. "Uptake and additionality in a green payment program: A panel data study of the Maryland cover crop program." Agricultural and Applied Economics Association Conference. Washington, DC.

Fleming, P., E. Lichtenberg, and D. Newburn. 2018. "Water quality trading program design with heterogeneous behavioral responses." Northeast Agricultural and Resource Economics Association. Philadelphia, Pennsylvania.

Wrenn, D., H.A. Klaiber, and D. Newburn. 2017. "Price-based policies for managing residential development and impacts to water quality." Agricultural and Applied Economics Association Conference. Chicago, Illinois.

Fleming, P., E. Lichtenberg, and D. Newburn. 2017. "Targeting agricultural cost share payments for nutrient abatement in the Chesapeake Bay Watershed." Association of Environmental and Resource Economics Conference. Pittsburg, Pennsylvania.

Wrenn, D., H.A. Klaiber, and D. Newburn. 2017. "Price-based policies for residential development patterns and impacts to water quality in the Chesapeake Bay." Association of Environmental and Resource Economics Conference. Pittsburg, Pennsylvania.

Fleming, P., E. Lichtenberg, and D. Newburn. 2017. "Targeting agricultural cost share payments for nutrient abatement in the Chesapeake Bay Watershed." Northeast Agricultural and Resource Economics Association, Arlington, Virginia.

Ferris, J. and D. Newburn. 2016. "Additionality and forest conservation regulation for residential development." Association of Environmental and Resource Economics Conference. Breckinridge, Colorado.

Fleming, P., E. Lichtenberg, and D. Newburn. 2016. "Behavioral response to agricultural cost sharing and implications for water quality in the Chesapeake Bay." Association of Environmental and Resource Economics Conference. Breckinridge, Colorado.

Bou-Zeid, E., Y. Ryu, J. Smith, and D. Newburn. 2015. "The hydrometeorological implications of zoning laws: Can land use regulations of urban density and sprawl improve a city's resilience?" American Geophysical Union. San Francisco, California.

Gnagey, M., E. Irwin, H.A. Klaiber, and D. Newburn. 2015. "Smart growth, development moratoria, and land use patterns." Southern Economic Association. New Orleans, Louisiana.

Newburn D. and J. Ferris. 2015. "Downzoning for managing exurban development." Association of Environmental and Resource Economics Conference. San Diego, California.

Fleming, P., E. Lichtenberg, and D. Newburn. 2015. "Agricultural cost sharing and conservation practices for nutrient reduction in the Chesapeake Bay Watershed." Agricultural and Applied Economics Association Conference. San Francisco, California.

Wrenn, D., H.A. Klaiber, and D. Newburn. 2015. "Confronting endogeneity in a duration model of residential subdivision development." Agricultural and Applied Economics Association Conference. San Francisco, California.

Newburn D. and J. Ferris. 2014. "Zoning and residential development." North American Regional Science Conference. Washington, DC.

Wrenn, D., H.A. Klaiber, D. Newburn, and E. Irwin. 2014. "An equilibrium model of household sorting and residential land development." North American Regional Science Conference. Washington, DC.

Ferris, J. and D. Newburn. 2014. "Residential development and the effect of competing forest conservation policies." Agricultural and Applied Economics Association Conference. Minneapolis, Minnesota.

Newburn D. and J. Ferris. 2014. "The effect of downzoning on spatial development patterns." Agricultural and Applied Economics Association Conference. Minneapolis, Minnesota.

Woodward, R., M. Mezzatesta, and D. Newburn. 2014. "Additionality, reverse crowding out, and pollution offsets". World Congress of Environmental and Resource Economists. Istanbul, Turkey.

Irwin, E., D. Wrenn, and D. Newburn. 2013. "The structural effects of zoning on residential land markets." North American Regional Science Conference. Atlanta, Georgia.

Wrenn, D, E. Irwin, and D. Newburn. 2013. "The structural effects of zoning on residential land markets." Association of Environmental and Resource Economics Conference. Banff, Canada.

Mezzatesta M., D. Newburn, and R. Woodward. 2012. "Additionality and the adoption of farm conservation practices." Association of Environmental and Resource Economics Conference. Asheville, North Carolina.

Newburn, D., and P. Berck. 2011. "Exurban development." North American Regional Science Conference. Miami, Florida.

Mezzatesta M., D. Newburn, and R. Woodward. 2011. "Additionality and the adoption of farm conservation practices." Agricultural and Applied Economics Association Conference. Pittsburg, Pennsylvania.

Towe, C., A. Klaiber, D. Wrenn, D. Newburn, and E. Irwin. 2011. "Exploiting spatial and temporal variations in residential subdivision development to identify urban growth spillovers." Agricultural and Applied Economics Association Conference. Pittsburg, Pennsylvania.

Newburn D., N. Brozovic, and M. Mezzatesta. 2011. "Agricultural water security and instream flows for endangered species." Association of Environmental and Resource Economics Conference. Seattle, Washington.

Newburn, D., and P. Berck. 2011. "A spatial dynamic model of exurban development." Association of Environmental and Resource Economics Conference. Seattle, Washington.

Towe, C., A. Klaiber, D. Wrenn, D. Newburn, and E. Irwin. 2011. "Exploiting spatial and temporal variations in residential subdivision development to identify urban growth spillovers." Association of Environmental and Resource Economics Conference. Seattle, Washington.

Mezzatesta M., D. Newburn, and N. Brozovic. 2010. "Agricultural water security and instream flows for endangered species." Fifth World Congress of Environmental and Resource Economists. Montreal, Canada.

Newburn, D., and N. Brozovic. 2009. "Environmental compliance, instream flows, and endangered species." Association of Environmental and Resource Economics sessions at the Agricultural and Applied Economics Association Annual Meeting. Milwaukee, Wisconsin.

Grantham, T., A. Merenlender, D. Newburn. 2008. "Effects of summer flow variability on juvenile salmonid survival in coastal California streams." American Fisheries Society Annual Meeting, Ottawa, Canada.

Berck, P. and D. Newburn. 2008. "On exurban development." European Association of Environmental and Resource Economists. Gothenburg, Sweden.

Newburn, D. and P. Berck. 2007. "Exurban leapfrog development and housing production technologies." American Agricultural Economics Association Annual Meeting. Portland, OR.

Newburn, D. and P. Berck. 2007. "The importance of sewer extension costs for the value of future development on agricultural land." Allied Social Science Association Meeting. Chicago, IL.

Newburn, D. and A. Merenlender. 2007. "Spatially explicit models demonstrate the importance of preventing rural residential development and inform land conservation planning on private-land." 103<sup>rd</sup> American Association of Geographers Meeting, San Francisco, California.

Berck, P. and D. Newburn. 2007. "Residential development under coordinated and unilateral growth management policies." 14<sup>th</sup> Ulvon Conference on Environmental Economics. Ulvon, Sweden.

Newburn, D. and P. Berck. 2006. "Modeling suburban and rural residential development beyond the urban fringe." American Agricultural Economics Association Annual Meeting. Long Beach, CA.

Lohse, K., D. Newburn, J. Opperman, C. Brooks, and A. Merenlender. 2005. "Towards sustaining water resources and aquatic ecosystems: forecasting watershed risks to current and future land use change. Joint Session of the American Geophysical Union and the North American Benthological Society, New Orleans, Louisiana.

Newburn, D., P. Berck, and A. Merenlender. 2005. "The importance of economics and land use change in reserve site selection." Annual Meeting of the American Agricultural Economics



Association, Providence, Rhode Island.

Newburn, D. 2005. "A clean break: Modeling urban and exurban residential development patterns" 46th Annual Conference of the Association of Collegiate Schools of Planning. Kansas City, MO.

Merenlender, A., J. Opperman, K. Lohse, D. Newburn, and C. Brooks. 2005. "Consequences of current and future land use for anadromous fish habitat in a Mediterranean climate basin, California." European International Association for Landscape Ecology Congress, Faro, Portugal.

Newburn, D. 2004. "Spatial targeting strategies for land conservation." American Agricultural Economics Association Annual Meeting. Denver, CO.

Newburn, D., S. Reed, P. Berck and A. Merenlender. 2004. "Maximizing the benefits of incentive-based conservation on private lands." Annual Meeting of the American Association of Geographers. Philadelphia, PA.

Newburn, D. 2003. "Land conservation strategies for habitat and open space protection". Annual Meeting of the American Association of Geographers. New Orleans, LA.

Newburn, D. 2002. "Spatial estimation of conservation easement values." Second World Congress of Environmental and Resource Economists. Monterey, CA.

#### *Non-Refereed Presentations*

Berck, P. and D. Newburn. 2008. "Some thoughts on land use." Resources for the Future. Washington, DC.

Newburn, D. 2007. "The effects of exurban and suburban development on agricultural land values." Department of Agricultural Economics, Texas A&M University.

Berck, P. and D. Newburn. 2007. "Some thoughts on land use." Environment for Development Initiative. Cape Town, South Africa.

Newburn, D. 2006. "Targeting payments for environmental services." Center for Conservation Biology. Stanford University, Palo Alto, California.

Newburn, D. 2005. "A Clean Break: Spatial models of urban and exurban residential development patterns." University of Illinois, Urbana-Champaign, Department of Agricultural and Consumer Economics. Urbana, IL.

Newburn, D. 2003. "The importance of economics and land use change in reserve site selection." University of California, Berkeley. Department of Agricultural and Resource Economics. Berkeley, California.

Merenlender, A., D. Newburn, and E. Heaton. 2001. "Mapping and forecasting vineyard development in Sonoma County." *Enometrics VIII*. St. Helena, California.

### *Workshops*

Fleming, P., E. Lichtenberg, and D. Newburn. 2019. "Water quality trading in the presence of existing cost share programs." *Integrated Assessment Models and the Social Costs of Water Pollution Workshop*. Cornell University, Ithaca, New York.

Fleming, P., E. Lichtenberg, D. Newburn, and H. Wang. 2018. "Costs of agricultural nonpoint pollution abatement in the Chesapeake Bay watershed." *Integrated Assessment Models and the Social Costs of Water Pollution Workshop*, Iowa State University, Ames, Iowa.

Woodward, R., M. Mezzatesta, and D. Newburn. 2013. "Additionality, reverse crowding out, and pollution offsets in water quality trading." *Heartland Workshop in Environmental and Resource Economics*, University of Illinois, Urbana, Illinois.

Woodward, R. and D. Newburn. 2009. "The Great Miami River Watershed Water Quality Credit Trading Program." *Environmental Protection Agency sponsored workshop on Market Mechanisms and Incentives*. Washington, DC.

Newburn, D. and P. Berck. 2008. "On exurban development." *10<sup>th</sup> Occasional California Workshop on Environmental and Resource Economics*. Bren School of Environmental Science and Management, University of California, Santa Barbara, California.

### **Professional and Extension Publications**

# mentored student

#### *Referred Extension Publications*

Newburn, D., A. Alberini, A. Rockler, and A. Karp#. 2013. "Adoption of household stormwater best management practices." *University of Maryland Extension, Extension Bulletin EB-413*, pp. 21. Available at: <http://drum.lib.umd.edu/handle/1903/14974>.

#### *Non-Referred Extension Publications*

Lewis, R., D. Newburn, K. Zlevor, and G. Knaap. 2017. "Conservation land-use policy toolkit." *Chesapeake Bay Trust and National Center for Smart Growth*, pp. 103. Available at: <http://drum.lib.umd.edu/handle/1903/19228>.

Friedrichs, C., T. Dillaha, J. Gray, R. Hirsch, A. Miller, D. Newburn, J. Pizzuto, L. Sanford, J. Testa, G. Van Houtven, and P. Wilcock. 2014. "Review of the Lower Susquehanna River Watershed Assessment." *Chesapeake Bay Program Scientific and Technical Advisory Committee Report*. No. 14-006, Edgewater, MD, pp. 40.

#### *Policy Briefs*

Newburn, D. 2017. "Maryland's Forest Conservation Act and the impact on residential

development and forest cover change in rural Baltimore County.” Department of Agricultural and Resource Economics.

Newburn, D. 2017. “Downzoning for the preservation of agricultural and forest lands.” Department of Agricultural and Resource Economics.

## **Sponsored Research**

### *Grants*

United States Department of Agriculture, McIntire-Stennis Grant Program. “Economic Incentives for Enhancing Riparian Forest Buffer Adoption.” \$60,000. 7/2020-6/2022. Principal Investigator: David Newburn.

Maryland Agricultural Experiment Station Competitive Grant Program. “Evaluating the Effectiveness of Subsidies for Agricultural Conservation Practices and Water Quality in the Chesapeake Bay.” \$30,000. 1/2019-6/2020. Principal Investigator: David Newburn, Co-PI: Erik Lichtenberg. (Newburn PI amount, \$15,000)

Chesapeake Bay Trust. “Evaluation of Land Use Policy Options, Incentives and Planning Tools to Reduce the Rate of Conversion of Agricultural Lands, Forest and Wetlands.” \$66,077. 4/2016-1/2017. Principal Investigator: Gerritt Knaap, Co-PI: David Newburn. (Newburn co-PI amount, \$33,038)

National Science Foundation, Coastal SEES Collaborative Research Program. “Restoration, Redevelopment, Revitalization and Nitrogen in a Coastal Watershed.” \$1.5 million. 9/2014-8/2017. Principal Investigator: Peter Groffman, Co-PI’s: Larry Band, Ed Doheny, Morgan Grove, Sujay Kaushal, Shannon LaDeau, Andy Miller, David Newburn, Emma Rosi-Marshall, Charles Towe, Claire Welty. (Newburn co-PI amount, \$113,057)

National Science Foundation, Water and Sustainable Climate Program. “Linkages and Feedbacks between Regional Climate Variability and Patterns of Urban Development: Impacts on the Urban Water Cycle and Nutrient Export.” \$5.0 million. 1/2011-12/2015. Principal Investigator: Claire Welty, Co-PI’s: Elie Bou-Zeid, Ed Doheny, Peter Groffman, Art Gold, Morgan Grove, Elena Irwin, Allen Klaiber, Sujay Kushal, Andy Miller, Michael McGuire, David Newburn, Jim Smith, Charles Towe. (Newburn co-PI amount, \$20,561)

United States Department of Agriculture under the Agriculture and Food Research Institute (AFRI) Competitive Grants Program. “Agricultural Water Security and Instream Flows for Endangered Salmonids in Coastal California’s Watersheds.” \$110,352. 12/2009-12/2011. Principal Investigator: David Newburn, Co-PI’s: Nicholas Brozovic, Ximing Cai, and Adina Merenlender. (Newburn PI amount, \$81,806)

Environmental Protection Agency Science to Achieve Results (EPASTAR) Program: Market Mechanisms and Incentives. “Efficiency and Design Lessons from the Great Miami Watershed Water Quality Credit Trading Program.” \$185,796. 9/2007-3/2009. Principal Investigator:

Richard Woodward, Co-PI: David Newburn. (Newburn co-PI amount, \$92,898)

### *Contracts*

Cooperative Agreement with Ohio State University Research Foundation and United States Forest Service. "Modeling Spatial Patterns of Urban Development and Impacts to Nutrient Export in the Baltimore Metropolitan Region." \$41,587. 7/2013-6/2016. Principal Investigator: David Newburn.

Cooperative Agreement with Ohio State University Research Foundation and United States Forest Service. "Spatial Analysis of Residential Development in Baltimore County." \$40,000. 1/2011-9/2012. Principal Investigator: David Newburn.

Cooperative Agreement with Economic Research Service United States Department of Agriculture. "Additionality and the Adoption of Farm Conservation Practices." \$32,716. 8/2010-8/2011. Principal Investigator: Richard Woodward, Co-PI: David Newburn. (Newburn co-PI amount, \$16,358)

### **Research Fellowships, Prizes, and Awards**

Integrated Research & Extension Excellence Award for the College of Agriculture and Natural Resources, 2017.

Ciriacy-Wantrup Postdoctoral Fellowship in Natural Resource Economics, 2003-2005.

Lincoln Institute for Land Policy Dissertation Fellowship, 2001-2002.

University of California Graduate Fellowship, 1998-1999.

University of Maryland Honors Scholarship, 1987-1991.

Phi Beta Kappa, 1991.

### **TEACHING, MENTORING AND ADVISING**

#### **Courses Taught**

AREC 455: Economics of Land Use (17-75 students), taught in Fall 2012, Fall 2013, Fall 2014, Fall 2015, Fall 2016, Fall 2017, Fall 2018, Fall 2019, Fall 2020

AREC 200: The Chesapeake Bay Ecosystem: Intersection of Science, Economics and Policy, guest lectures in Spring 2012

AGEC 350: Environmental and Natural Resource Economics (36-40 students), taught in Fall 2008, Fall 2010

AGEC 422: Land Economics (63-81 students), taught in Spring 2008, Spring 2010, Spring 2011

AGEC 603: Land Economics (39-50 students), taught in Spring 2008, Spring 2009, Spring 2010, Spring 2011

AGEC 677: Frontiers in Spatial Modeling for Resource Economics (6 students), taught in Spring 2010

## **Teaching Innovations**

### *Course or Curriculum Development*

Chesapeake Project Teaching Workshop: Integrating Sustainability across the Curriculum, May 2012.

## **Advising: Research or Clinical**

### *Undergraduate*

Jason Wong, 2013, Agricultural and Resource Economics (Committee Member)

### *Master's*

Kushal Gurung, 2011-2012, Rangeland Ecology and Management, Texas A&M University (Committee Co-Chair)

Alexander Griffin, 2010-2011, Agricultural Economics, Texas A&M University (Committee Chair)

Denise Martinka, 2010-2011, Agricultural Economics, Texas A&M University (Committee Member)

Vinh Nguyen, 2010-2011, Land Development, Texas A&M University (Committee Member)

Dan Galindo, 2008-2009, Urban Planning, Texas A&M University (Committee Member)

### *Doctoral*

Haoluan Wang, 2018-present, Agricultural and Resource Economics (Committee Co-Chair)

Andrew Rosenberg, 2016-2019, Agricultural and Resource Economics (Committee Co-Chair)

Youpei Yan, 2016-2019, Agricultural and Resource Economics (Committee Member)

Zhi Li, 2015-2016, Urban and Regional Planning and Design (Committee Member)

Yoanna Kraus Elsin, 2013-2019, Agricultural and Resource Economics (Committee Member)

Patrick Fleming, 2013-2016, Agricultural and Resource Economics (Committee Co-Chair)

Jeffrey Ferris, 2012-2015, Agricultural and Resource Economics (Committee Chair)

Siyi Feng, 2008-2012, Agricultural Economics, Texas A&M University (Committee Member)

Mariano Mezzatesta, 2007-2012, Agricultural Economics, Texas A&M University (Committee Co-Chair)

## **Mentorship**

### *Junior Faculty*

Mary Zaki, 2018-2019, Agricultural and Resource Economics

Rebecca Epanchin-Niell, 2020-present, Agricultural and Resource Economics

## **Professional and Extension Education**

### *Major Extension Programs*

#### *Extension Presentations on Water Quality Issues for the Chesapeake Bay and Other Regions*

“Adoption of household stormwater management practices and lawn fertilizer behavior.”

Maryland Sea Grant Extension Watershed Specialist Group. December, 2020.

“Lawn fertilizer management in the Baltimore Metropolitan Region.” Baltimore Ecosystem Study Annual Meeting. Baltimore, Maryland, October, 2020.

“Residential lawn fertilizer management decisions”. Long Island Sound Study and Connecticut Sea Grant, April, 2020.

“Water quality trading in the presence of existing cost share programs: Implications for water quality management in the Chesapeake Bay.” AGNR Cornerstone Event: Ensure a Clean & Healthy Chesapeake Bay. College Park, Maryland, October, 2019.

“Water quality trading and the Maryland Agricultural Cost Share program: Implications for cover crop adoption and water quality in the Chesapeake Bay.” Maryland Department of Agriculture. Annapolis, Maryland, March, 2019.

“Water quality trading in the presence of existing cost share programs: Implications for water quality management in the Chesapeake Bay.” Agricultural Outlook and Policy Conference. Annapolis, Maryland, January, 2019.

“Household willingness to pay for stream restoration on private and public land: Evidence from the Baltimore Metropolitan Region.” Baltimore Ecosystem Study Annual Meeting. Baltimore, Maryland, October, 2018.

“Effectiveness of Maryland’s cover crop program for the nitrogen abatement in the Chesapeake Bay.” Poster presented at the AGNR Global Challenges: Building Healthy Food Systems Conference. College Park, Maryland, October, 2018.

“Water quality trading in the presence of existing agricultural cost-share programs: Implications for nitrogen abatement in the Chesapeake Bay.” Chesapeake Bay Commission, Annapolis, Maryland, October, 2018.

“Price-based policies for managing residential development and impacts to water quality in the Baltimore Region.” Baltimore Ecosystem Study Annual Meeting. Baltimore, Maryland, October, 2017.

“Cost sharing for agricultural conservation practices and water quality impacts in the Chesapeake Bay Watershed.” Chesapeake Bay Foundation, Annapolis, Maryland, May, 2017.

“Effectiveness of Maryland’s cover crop program for the nutrient abatement in the Chesapeake

Bay.” Maryland Department of Agriculture. Annapolis, Maryland, February, 2017.

“Cost sharing for agricultural conservation practices and water quality impacts in the Chesapeake Bay Watershed.” United States Geological Survey, Maryland-Delaware-District of Columbia Water Science Center, Baltimore, Maryland, February, 2017.

“Opportunities for agricultural producers in Maryland’s nutrient trading program.” Maryland Farm Bureau Convention. Ocean City, Maryland, December, 2016.

“Behavioral response to agricultural cost sharing and implications for water quality in the Chesapeake Bay Watershed.” Agricultural Outlook and Policy Conference. Annapolis, Maryland, December, 2016.

“Economic fundamentals of nutrient trading.” Agricultural and Environmental Law Conference. Annapolis, Maryland, November, 2016.

“Agricultural cost sharing and water quality in the Chesapeake Bay.” Baltimore Ecosystem Study Annual Meeting. Baltimore, Maryland, October, 2016.

“Incentives for agricultural and urban stormwater management practices: Implications for water quality in the Chesapeake Bay.” Environmental Finance Center. College Park, Maryland, April 2016.

“Fundamentals of nutrient trading.” Nutrient Trading Symposium sponsored by Maryland Department of Agriculture, Maryland Department of Environment and Harry Hughes Center for Agroecology, Wye Mills, Maryland, January, 2016.

“Household response to environmental incentives for rain garden adoption.” Baltimore Ecosystem Study Annual Meeting. Baltimore, Maryland, October, 2015.

“Agricultural best management practices and cost sharing.” Agricultural Outlook and Policy Conference. Annapolis, Maryland, December, 2014.

“Stormwater and land-use planning in the Upper Western Shore.” Upper Western Shore Tributary Team. Forest Hill, Maryland, August 2014.

“Adoption of household stormwater best management practices.” Montgomery County Clean Water Summit. Silver Spring, Maryland, March, 2014.

“Stormwater remediation fees and incentives for rain garden adoption.” Baltimore Urban Waters Partnership. Catonsville, Maryland, March, 2014.

“Incentives and barriers for rain gardens”. Columbia Association, Howard County Office on Environmental Sustainability, and Alliance for the Chesapeake Bay. Columbia, Maryland, March, 2014.

“Nutrient trading in Maryland for the Chesapeake Bay TMDL.” Maryland Department of the Environment. Baltimore, Maryland, January, 2014.

“Stormwater management practices.” AGNR Extension In-Service Workshop. Annapolis, Maryland, January, 2014.

“Additionality and the adoption of agricultural conservation practices.” United States Department of Agriculture/Farm Foundation. Washington, DC, August, 2013.

“Adoption of household stormwater management practices.” Maryland Sea Grant Extension Watershed Specialist Group. College Park, Maryland, July, 2013.

“Development trends and the impact of OSDS tier regulations on reservoir water supply in the Baltimore Metropolitan Region.” Baltimore Metropolitan Council Reservoir Technical Group. Baltimore, Maryland, May, 2013.

“Water quality implications from the septic bill regulations.” Baltimore County Commission on Environmental Quality. Towson, Maryland, February, 2013.

“Additionality and the adoption of conservation practices.” Economic Research Service United States Department of Agriculture. Washington, DC, October, 2010.

“Agricultural water security and instream flows for endangered species.” Sonoma Ecology Center. Sonoma, California, December, 2009.

“Efficiency and design lessons from the Great Miami River Watershed Water Quality Credit Trading Program.” Miami Conservancy District. Dayton, Ohio, September, 2009.

“Spatial estimation of water demand and supply for salmon recovery.” Salmon Coalition. Windsor, California, July, 2006.

“Agricultural and urban water management.” Sonoma County Water Agency. Ukiah, California, October, 2005.

*Extension Presentations on Land-Use Regulations and Preservation of Agricultural and Resource Areas*

“Smart growth 20 years later: Impact on farm and forest conservation.” AGNR Cornerstone Event: Ensure a Clean & Healthy Chesapeake Bay. College Park, Maryland, October, 2019.

“Maryland’s Forest Conservation Act and the impact on residential development and forest cover change.” Maryland Land Conservation Conference. Linthicum Heights, Maryland, May 2019.

“The effectiveness of zoning and the Forest Conservation Act for land preservation.” Cecil County Department of Land Use & Development Services. Elkton, Maryland, October 2018.



“Maryland’s Forest Conservation Act and the impact on residential development and forest cover change.” Chesapeake Bay Commission, Greenbelt, Maryland, August 2018.

“Land conservation approaches for the Chesapeake Bay watershed.” Chesapeake Conservation Partnership. Annapolis, Maryland, August 2018.

“Maryland’s Forest Conservation Act and the impact on residential development and forest cover change.” Baltimore Urban Waters Partnership Meeting. Catonsville, Maryland, December, 2017.

“Maryland’s Forest Conservation Act.” House Environmental and Transportation Committee, Maryland Legislature, Annapolis, Maryland, November, 2017.

“Forest conservation regulations in Maryland.” Chesapeake Bay Foundation, Annapolis, Maryland, October, 2017.

“Evaluation of land-use policy options, incentives and planning tools in the Chesapeake Bay Watershed.” Chesapeake Bay Program Maintain Healthy Watersheds Goal Implementation Team and Land Use Work Group. Annapolis, Maryland, May 2017.

“Growth management policies for residential development.” Chesapeake Environmental Protection Association. Edgewater, Maryland, May 2015.

“Synergies between the Forest Conservation Act and land preservation programs.” Forest Service Statewide Programs, Maryland Department of Natural Resources. Annapolis, Maryland, April, 2015.

“Forest Conservation Act and residential development.” Sustainable Forestry Council, Maryland Department of Natural Resources. Annapolis, Maryland, March, 2015.

“Maryland’s Forest Conservation Act and the impact on residential development and forest cover change.” Baltimore Ecosystem Study Annual Meeting. Baltimore, Maryland, October, 2014.

“Modeling the effect of downzoning on spatial development patterns in Baltimore County: A pioneer in smart growth.” National Center for Smart Growth, University of Maryland, College Park, Maryland, September, 2014.

“Forecasting exurban development for transportation and infrastructure planning.” Baltimore County Department of Planning. Towson, Maryland, February, 2014.

“Maryland’s Forest Conservation Act and the impact on residential development and forest cover change.” Baltimore County Department of Environmental Protection and Sustainability. Towson, Maryland, February, 2014.

“The effect of rural downzoning on residential development.” Baltimore Ecosystem Study Annual Meeting. Baltimore, Maryland, October, 2013.

“Modeling residential development in the Baltimore Metropolitan Region.” Maryland Department of Planning. Baltimore, Maryland, October, 2013.

“Mapping and modeling low-density residential development in the Chesapeake Bay Watershed.” Chesapeake Bay Program Land Use Work Group. Annapolis, Maryland, June, 2013.

“The effect of the septic bill (SB 236) in Maryland.” Agricultural Outlook and Policy Conference. Annapolis, Maryland, March, 2013.

“Land-use and environmental policies impacts on residential development.” Baltimore County Department of Environmental Protection and Sustainability. Towson, Maryland, February, 2013.

“Urban sprawl and forest conservation.” United States Forest Service. Catonsville, Maryland, January, 2013.

“Residential development, septic bill regulations, and rural-urban zoning.” Baltimore County Department of Environmental Protection and Sustainability. Towson, Maryland, July, 2012.

“Land conservation strategies for habitat and open space protection.” The Nature Conservancy. San Francisco, California, July, 2003.

“Land conservation strategies for habitat and open space protection.” Sonoma County Agricultural Preservation and Open Space District. Santa Rosa, California, March, 2003.

“Spatial estimation of conservation easement values.” Sonoma County Agricultural Preservation and Open Space District. Santa Rosa, California, April, 2002.

“Spatial economic models of deforestation.” Mexican Ministry of the Environment and Natural Resources (SEMARNAT). Mexico City, Mexico, February, 2002.

## **SERVICE AND OUTREACH**

### **Editorships, Editorial Boards, and Reviewing Activities**

#### *Reviewing Activities for Journals and Presses*

Journal Reviewer and Referee for:

*Journal of the Association of Environmental and Resource Economists; Journal of Environmental Economics and Management; American Journal of Agricultural Economics; Proceedings of the National Academy of Sciences; Land Economics; Environmental and Resource Economics; Resources and Energy Economics; Natural Resource Modeling; Journal of Economic Geography; Journal of Agricultural and Resource Economics; Western Economic Forum; Journal of Soil and Water Conservation; International Journal of Remote Sensing; Conservation Biology; Ecological Applications; Journal of the American Water Resources Association; Water Resources Research*

### *Reviewing Activities for Agencies and Foundations*

Chesapeake Bay Program, “The Chesapeake Bay Land Change Model: A Stochastic Model for Simulating Regional Patterns of Residential and Commercial Development”, 2016

Maryland Department of Planning and American Farmland Trust, “The Future of Sustainable Farming and Forestry in Maryland”, 2016.

United States Geological Survey, “Bridging Connections between Models and Decisions Impacting Healthy Watersheds”, 2014.

United States Department of Agriculture, Economic Research Service, “Additionality in US Agricultural Conservation and Offset Programs”, 2013.

Eastern Shore Land Conservancy and Maryland Center for Agroecology, “Downzoning in Maryland”, 2012.

### **Committees, Professional & Campus Service**

#### *Campus Service - Department*

APT Committee, 2020

Qualifying Paper Committee, 2019-present.

Faculty Search Committee (chair), 2018-2019.

Faculty Search Committee, 2017-2018 & 2019-2020.

Graduate Committee, 2014-2017.

Undergraduate Committee, 2015-2018.

Extension Committee, 2014-2015 & 2017-present (chair).

Departmental Seminar Committee, 2012-2013.

Commons Committee. 2006-2011.

Community Economics Faculty Search Committee, 2007.

Computer Information Technology Committee, 2007-2011.

Departmental Seminar Committee, 2007-2011.

Secretary for Faculty Meetings, 2007- 2008.

Curriculum Committee for the Master’s Certificate in Land Economics and Rural Real Estate, 2008-2009.

Graduate Advisory Committee, 2008-2011.

Resource Economics Prelim Examination Committee, 2009-2011.

Resource Economics Work Group Leader, 2009-2011.

#### *Campus Service - College*

AGNR Strategic Initiative Implementation Team, Chesapeake Bay, 2018-2019 & 2019-present (co-chair).

Faculty Marshal Winter Commencement, 2016.

Agricultural and Natural Resource Policy Internship Program, Selection Committee, 2009.

*Campus Service - University*

University Senate Committee, 2013-2015.

*Other Non-University Committees, Memberships, Panels, etc.*

Cecil County Green Infrastructure Plan Steering Committee, Elkton, Maryland, 2018-2019.

Maryland Stream ReLeaf Coordinating Committee, Annapolis, Maryland, 2015-present.

National Center for Smart Growth, College Park, Maryland, 2015-present.

Chesapeake Bay Program, Scientific and Technical Advisory Committee, Annapolis, Maryland, 2014-2018.

Baltimore Ecosystem Study, Catonsville, Maryland, 2014-present.

Baltimore Urban Waters Federal Partnership, Baltimore, Maryland, 2013-present.

Chesapeake Bay Program, Land Use Work Group, Annapolis, Maryland, 2012-2018.

National Research Council Workshop on Needs and Research for Land Change Modeling, Chapel Hill, NC, 2012.

Environmental Law Institute, Conservation Thresholds Working Group, Washington, DC, 2008-2010.