Steve Hankey

140 Otey Street, Blacksburg, VA 24061
p: 540.231.7508, e: hankey@vt.edu
www.stevenhankey.com

Academic Appointments

2020-present *Associate Professor of Urban Affairs and Planning*, College of Architecture and Urban Studies, Virginia Polytechnic Institute and State University.

2014-2020 *Assistant Professor of Urban Affairs and Planning*, College of Architecture and Urban Studies, Virginia Polytechnic Institute and State University.

2016-present *Affiliate Faculty*, Civil and Environmental Engineering, College of Engineering, Virginia Polytechnic Institute and State University.

2018-present *Affiliate Faculty*, BioBuild Program, Interdisciplinary Graduate Education Program, Virginia Polytechnic Institute and State University.

Education

2014 *PhD*, Civil Engineering, University of Minnesota.

2012 *MURP*, Urban and Regional Planning, University of Minnesota, *Minor*: Public Health.
MS, Civil Engineering, University of Minnesota.

2005 *BS*, Chemical Engineering, University of Wisconsin.

Teaching Experience

2014-present Land Use and Environment: Planning and Policy; Urban and Regional Analysis; Active Transportation for a Healthy, Sustainable Planet; Pollution Control Planning and Policy; GIS Applications in Urban Planning; PhD Colloquium.

Awards and Honors

2020 *Certificate of Excellence in Scholarship*, College of Architecture and Urban Studies, VT.

2018 *Certificate of Teaching Excellence*, College of Architecture and Urban Studies, VT.

2017 *Faculty of the Year*, Virginia American Planning Association.

2016 *Outstanding Paper*, Pedestrian Committee, Transportation Research Board.

2015 *People's Choice Award*, Best Poster, Save Our Towns Summit.

2013 *Sally Liu Outstanding Doctoral Student in Air Pollution Exposure Science Award*, Annual meeting of the International Society of Exposure Science.

Professional Experience

2006-2008 *Operations Manager*, Zipcar Inc. Responsible for the launch of 2 Zipcar markets (Toronto, ON and Vancouver, BC) and managing 5-10 employees per market.

Professional Organizations

Transportation Research Board (TRB); American Planning Association (APA); International Society of Environmental Epidemiology (ISEE); Association for Collegiate Schools of Planning (ACSP).

Peer Reviewed Publications

Note: An "*" represents a student under my supervision on a project where I am the PI. IF: Impact Factor.

2021 Lu, T.*, Bechle, M., Wan, Y., Presto, A., Hankey, S. *Using crowd-sourced low-cost sensors in a land use regression of PM2.5 in 6 US cities*. Air Quality, Atmosphere & Health. [IF: 3.8]

Xu, C., Hystad, P., Chen, R., Van Den Hoek, J., Hutchinson, R.A., Hankey, S., Kennedy, R. *Application of training data affects success in broad-scale local climate zone mapping*. International Journal of Applied Earth Observation and Geoinformation. [IF: 5.9]

Lu, T.*, Marshall, J., Zhang, W., Hystad, P., Kim, S., Bechle, M… Hankey, S. *National empirical models of air pollution using microscale measures of the urban environment*. Environmental Science and Technology. [IF: 6.7]

Saha, P., Hankey, S., Marshall, J., Robinson, A., Presto, A. *High-spatial-resolution estimates of ultrafine particle concentrations across the continental United States*. Environmental Science and Technology. [IF: 6.7]

Qi, M.*, Hankey, S. *Using street view imagery to predict street-level particulate air pollution*. Environmental Science and Technology. [IF: 6.7]

Hankey, S., Zhang, W., Le, H*., Hystad, P., James, P. *Predicting bicycling and walking traffic using street view imagery and destination data*. Transportation Research Part D: Transport and Environment. [IF: 3.4]

2020   Yeganeh, A., McCoy, A., Reichard, G., Schenk, T., Hankey, S. *Green building and policy innovation in the US Low-Income Housing Tax Credit programme*. Building Research and Information. [IF: 5.1]

Le, H.*, Buehler, R., Fan, Y., Hankey, S. *Expanding the positive utility of travel through weeklong tracking: Within-person and multi-environment variability of ideal travel time*. Journal of Transport Geography. [IF: 3.6]

Demuzere, M., Hankey, S., Mills, G., Zhang, W., Lu, T.*, Bechtel, B. *Combining expert and crowd-sourced training data to map urban form and functions for the continental US*. Nature Scientific Data. [IF: 5.9]

Kim, S., Bechle, M., Hankey, S., Sheppard, L., et al., *Concentrations of criteria pollutants in the contiguous U.S., 1979-2015: Role of prediction model parsimony in integrated empirical geographic regression*. PLOS ONE. [IF: 2.8]

2019   Yeganeh, A., McCoy, A., Hankey, S., *Green affordable housing: Cost-benefit analysis for zoning incentives*. Sustainability, 11(12), 6292. [IF: 4.6]
Glasgow*, T., Le*, HTK, Geller, E., Fan, Y., Hankey, S., *How transport modes, the built and natural environments, and activities are associated with mood: A GPS smartphone app study*. Journal of Environmental Psychology, 66, 101345. [IF: 3.6]

Botello, B., Buehler, R., Hankey, S., Mondschein, A., Jiang, Z., *Planning for walking and cycling in an autonomous-vehicle future*. Transportation Research Interdisciplinary Perspectives, (in press). [IF: N/A]

Le*, HTK, Buehler, R., Hankey, S., *Have walking and cycling increased in the US? A 13-year longitudinal analysis of traffic counts from 13 metropolitan areas*. Transportation Research Part D: Transport and Environment, 69, 329-345. [IF: 3.4]

Lu*, T., Lansing, J., Zhang, W., Bechle, M., Hankey, S., *Land Use Regression models for 60 volatile organic compounds: Comparing Google Point of Interest (POI) and city permit data*. Science of the Total Environment, 677, 131-141. [IF: 4.6]

Hankey, S., Sforza, P., Pierson, M., *Using mobile monitoring to develop hourly empirical models of particulate air pollution in a rural Appalachian community*. Environmental Science and Technology, 53(8), 4305-4315. [IF: 6.7]

Le*, HTK., West, A., Quinn, F., Hankey, S., *Advancing cycling among women: An exploratory study of North American cyclists*. JTLU, 12(1), 355-374. [IF: N/A]

2018   Glasgow*, T., Geller, S., Le*, HTK, Hankey, S., *Travel Mood Scale: Development and validation of a survey to measure mood during transportation*. Transportation Research Part F: Traffic Psychology and Behaviour, 59, 318-329. [IF: 1.9]

Le*, HTK, Buehler, R., Hankey, S., *Correlates of the built environment and active travel: Evidence from 20 US metropolitan areas*. Environmental Health Perspectives, 126(07), 077011. [IF: 8.4]

Lu*, T., Mondschein, A., Buehler, R., <u>Hankey, S.</u>, *Adding temporal information to direct-demand models: Hourly estimation of bicycle and pedestrian traffic in Blacksburg, VA*. Transportation Research Part D: Transport and Environment, 63, 244-260. [IF: 3.4]

Yeganeh*, A., Hall, R., Pearce, A., <u>Hankey, S.</u>, *A social equity analysis of the U.S. public transportation system based on job accessibility*. Journal of Transport and Land Use. 11(1), 1039-1056. [IF: N/A]

2017 <u>Hankey, S.</u>, Lu*, T., Mondschein, A., Buehler, R., *Spatial models of active travel in small communities: Merging the goals of traffic monitoring and direct-demand modeling*, Journal of Transport and Health, 7, 149-159. [IF: 2.8]

<u>Hankey, S.</u>, Marshall, J.D., *Urban form, air pollution, and health*. Current Environmental Health Reports, 4(4), 491-503. [IF: N/A]

Lu*, T., Mondschein, A., Buehler, R., <u>Hankey, S.</u>, *Designing a bicycle and pedestrian traffic monitoring program to estimate AADT in a small rural college town*, Transportation Research Part D: Transport and Environment, 53, 193-204. [IF: 3.4]

<u>Hankey, S.</u>, Lindsey, G., Marshall, J.D., *Population-level exposure to particulate air pollution during active travel: Planning for low-exposure, health-promoting cities*. Environmental Health Perspectives, 125(4), 527-534. [IF: 8.4]

2016 <u>Hankey, S.</u>, Lindsey, G., *Facility-demand models of peak-period pedestrian and bicycle traffic: A comparison of fully-specified and reduced-form models*. Transportation Research Record. 2586, 48-58. [IF: 0.7]

Wang, J., Lindsey, G., <u>Hankey, S.</u>, Wu, X., *Monitoring and modeling urban trail traffic: Validation of direct demand models in Minneapolis, MN and Columbus, OH*. Transportation Research Record, 2593, 47-59. [IF: 0.7]

2015 <u>Hankey, S.</u>, Marshall, J.D., *On-bicycle exposure to particulate air pollution: particle number, black carbon, $PM_{2.5}$, and particle size*. Atmos. Environ., 122, 65-73. [IF: 3.7]

<u>Hankey, S.</u>, Marshall, J.D., *Land use regression models of particulate air pollution (particle number, black carbon, $PM_{2.5}$, particle size) using mobile monitoring*. Environmental Science & Technology, 49(15), 9194-9202. [IF: 6.7]

<u>Hankey, S.</u>, Sullivan, K., Kinnick, A., Koskey, A., et al., *Using objective measures of stove use and indoor air quality to evaluate a cookstove intervention in rural Uganda*. Energy for Sustainable Development, 25, 67-74. [IF: 2.7]

Dekoninck, L., Bottledooren, D., Int Panis, L., <u>Hankey, S.</u>, et al., *Applicability of a noise-based model to estimate in-traffic exposure to black carbon and particle number concentrations in different cultures*. Environment International, 74, 89-98. [IF: 7.3]

2014 <u>Hankey, S.</u>, Lindsey, G., Marshall, J.D., *Day-of-year scaling factors and design considerations for non-motorized traffic monitoring programs*. Transportation Research Record, 2468, 64-73. [IF: 0.7]

Wang, X., Lindsey, G., <u>Hankey, S.</u>, *Estimating mixed-mode urban trail traffic using negative binomial regression models*. Journal of Urban Planning and Development, 140(1), 1-9. [IF: N/A]

2012 <u>Hankey, S.</u>, Lindsey, G., Wang, X., Borah, J., et al., *Estimating use of non-motorized infrastructure: models of bicycle and pedestrian traffic in Minneapolis, MN*. Landscape and Urban Planning, 107(3), 307-316. [IF: 5.0]

<u>Hankey, S.</u>, Marshall, J.D., Brauer, M., *Health impacts of the built environment: within-urban variability in physical inactivity, air pollution, and ischemic heart disease mortality*. Environmental Health Perspectives, 120(2), 247-253. [IF: 8.4]

2010	Hankey, S., Marshall, J.D., *Impacts of urban form on future U.S. passenger-vehicle greenhouse gas emissions*. Energy Policy, 38(9), 4880-4887. [IF: 4.0]
2009	Boies, A., Hankey, S., Kittelson, D., Marshall, J.D., et al., *Reducing motor vehicle greenhouse gas emissions in a non-California state: a case study of Minnesota*. Environmental Science & Technology, 43(23), 8721-8729. [IF: 6.7]

Technical Reports

2018	Botello, B., Buehler, R., Hankey, S., Jiang, Z., Mondschein, A. "Planning for Walking and Cycling in an Autonomous-Vehicle Future." Mid-Atlantic Transportation Sustainability University Transportation Center, Charlottesville, VA.
	Griffen, G., Hankey, S., Simek, C., Le*, HTK, Buehler, R., "Street Noise Relationship to Vulnerable Road User Safety." Safe-D Univ. Transportation Center, Blacksburg, VA.
2017	Le*, HTK, Buehler, R., Hankey, S., "Multi-City, National Scale Direct-Demand Models of Peak-Period Bicycle and Pedestrian Traffic." Mid-Atlantic Transportation Sustainability University Transportation Center, Charlottesville, VA.
2016	Hankey, S., Lu*, T., Mondschein, A., Buehler, B., "Designing a Bicycle and Pedestrian Traffic Count Program to Estimate Performance Measures on Streets and Sidewalks in Blacksburg, VA." Mid-Atlantic Transportation Sustainability University Transportation Center, Charlottesville, VA.
2015	Lindsey, G., Petesch, M., Hankey, S., "The Minnesota Bicycle and Pedestrian Counting Initiative: Implementation Study." Minnesota Department of Transportation, Research Services Section, St. Paul, MN.
2013	Lindsey, G., Hankey, S., Wang, X., Chen, J., "The Minnesota Bicycle and Pedestrian Counting Initiative: Methodologies for Non-motorized Traffic Monitoring." Minnesota Department of Transportation, Research Services Section, St. Paul, MN.
	Lindsey, G., Hankey, S., Wang, X., "Feasibility of Using GPS to Track Bicycle Lane Positioning." Intelligent Transportation Systems Institute, Center for Transportation Studies, University of Minnesota, Minneapolis, MN.
2012	Lindsey, G., Hoff, K., Hankey, S., Wang, X., "Understanding Non-Motorized Transportation Facilities." Intelligent Transportation Systems Institute, Center for Transportation Studies, University of Minnesota, Minneapolis, MN.

Conference or Invited Presentations

Note: Abbreviations are ISEE (International Society of Environmental Epidemiology), TRB (Transportation Research Board), ALR (Active Living Research), NATMEC (National Travel Monitoring Exposition and Conference), AERA (American Educational Research Association), ACSP (Association of Collegiate Schools of Planning), CTS (Center for Transportation Studies, U. of MN), TPAQ (Transportation Planning and Air Quality), AGU (American Geophysical Union), EGU (European Geophysical Union), AAG (American Association of Geographers).

2021	*Oral Presentation*, Lead author (invited), "Using images to characterize the built and natural environment: Applications in air quality," Environmental Engineering seminar at University of Illinois-Urbana Champaign. September, Virtual.
	Poster Presentation, Student lead author, "A national land use regression model for NO2 using street view imagery and satellite-based air quality estimates," ISEE, August, Virtual.
	Poster Presentation, co-author, "Street-view greenspace exposure and childhood cognition," ISEE, August, Virtual.
	Oral Presentation, co-author, "Street-view greenspace exposure and objective sleep characteristics," ISEE, August, Virtual.
	Oral Presentation, Student lead author, "Activity space, environmental exposure, and subjective well-being: A multicity mobile health study," AAG, January, Virtual.

2020   *Oral Presentation*, Student lead author, "Using Google street view imagery in land use regression to predict street level particulate air pollution," ACSP, October, Virtual.

Oral Presentation, Student lead author, "Does open data offer opportunities to inform community health? The case of using low-cost sensors to develop urban air quality models," ACSP, October, Virtual.

Oral Presentation, Student lead author, "Using Google street view imagery in land use regression to predict street level particulate air pollution," ISEE, August, Virtual.

Poster Presentation, Student lead author, "Use of low-cost sensors to develop land use regression models for PM2.5 in 6 urban areas in the US," ISEE, August, Virtual.

Oral Presentation, Co-author, "Spatial patterns and spatial modelling of primary organic aerosol concentrations in three North American Cities," EGU, May, Virtual.

Oral Presentation, Lead author (invited), "Developing street-level measures of the built and natural environment for empirical models of air quality," US EPA, March, Virtual.

Poster Presentation, Co-author, "Measuring Urban green (infra)structure for pedestrian health: Reviews, evaluations, and recommendations," ALR, February, Orlando, FL.

Poster Presentation, Co-author, "On the variability of ideal travel time: Revisiting the positive utility of travel," TRB, January, Washington, DC.

2019   *Oral Presentation*, Co-author, "Community-level mapping of ambient air pollution in Louisville, KY," AGU, December, San Francisco, CA.

Oral Presentation, Student lead author, "Using a community-based low-cost sensor network to validate and improve air quality models," ACSP, October, Greenville, SC.

Oral Presentation, Student lead author, "Travel mode choice and well-being revisited: Tackling mode self selection attitude and satisfaction with travel and activities using a smartphone survey," ACSP, October, Greenville, SC.

Oral Presentation, Lead author, "Spatial predictions of active travel based on Google Street View Imagery and Place of Interest data," ISEE, August, Utrecht, Netherlands.

Poster Presentation, Student lead author, "External validation of national land use regression models for PM2.5 using low-cost sensor network," ISEE, August, Utrecht, Netherlands.

Poster Presentation, Student lead author, "How transport modes, the built and natural environment, and activities are associated with mood: A GPS smartphone app study," ISEE, August, Utrecht, Netherlands.

Oral Presentation, Co-author, "Comparison of informative and random selection of geographic variables in national-scale air pollution prediction," ISEE, August, Utrecht, Netherlands.

Poster Presentation, Co-author, "Air quality, asthma, and school absenteeism," Society for Research in Child Development, March, Baltimore, MD.

Poster Presentation, Co-author, "Pedestrian and bicycle crashes in Minneapolis: An equity perspective," ALR, February, Charleston, SC.

Poster Presentation, Co-author, "Exploring street noise and bicycle safety: Initial evidence from Austin, Texas, and the Washington, D.C., Capital area," TRB, January, Washington, DC.

Poster Presentation, Co-author, "Planning for walking and cycling in an autonomous vehicle future," TRB, January, Washington, DC.

2018   *Oral Presentation*, Lead author, "Leveraging Google POI data and machine learning to predict bicycle and pedestrian traffic volumes for the contiguous US," ACSP, October, Buffalo, NY.

Oral Presentation, Student lead author, "Using crowdsourcing, machine learning, and remote sensing to classify urban form: associations with urban air quality," ACSP, October, Buffalo, NY.

Oral Presentation, Student lead author, "Exploring the role of travel satisfaction and travel liking attitude on mode choice," ACSP, October, Buffalo, NY.

Poster Presentation, Student lead author, Travel-liking attitude revisited: Evidence from Washington, DC and Blacksburg, VA," ACSP, October, Buffalo, NY.

Oral Presentation, Student lead author, "Leveraging Google POI data, crowdsourcing, and machine learning to predict US NO_2 concentrations," ISEE, September, Ottawa, Canada.

Oral Presentation, Lead author, "Merging mobile measurements, traffic emissions models, and LUR towards real-time estimation of air pollution" ISEE, September, Ottawa, Canada.

Oral Presentation, Co-author, "A parsimonious approach to national prediction: Criteria pollutants in the contiguous US, 1979-2015," ISEE, September, Ottawa, Canada.

Poster Presentation, Student lead author, "Exploring the utilitarian and non-utilitarian bicycling behaviours of north American women cyclists," ISEE, September, Ottawa, Canada.

Poster Presentation, Student lead author, "Impact of the built environment on active travel: A longitudinal study of 12 US metropolitan areas," ISEE, September, Ottawa, Canada.

Oral Presentation, Student lead author, "Adding temporal information to direct-demand models: Hourly estimation of bike and ped. traffic in Blacksburg, VA," NATMEC, June, Irvine, CA.

Oral Presentation, Co-author, "Geographic and social mobility: The long-term effects of early childhood experiences," AERA, April, New York, NY.

Oral Presentation, Lead author, "Mobile monitoring of air pollution for improved exposure assessment," EWR Group CEE, Virginia Tech, February, Blacksburg, VA.

Poster Presentation, Co-author, "Exploring the relationship between street lighting levels and physical activity after dark: Results of a pilot study," ALR, February, Banff, Canada.

Poster Presentation, Student lead author, "Towards generalizability in direct-demand modelling: Exploratory models from 20 US jurisdictions," TRB, January, Washington DC.

Poster Presentation, Student lead author, "Affection for daily travel: Exploring satisfaction associated with travel modes and activity during trips," TRB, January, Washington DC.

2017   *Oral Presentation*, Student lead author, "An equity analysis of the US public transportation system based on job accessibility," ACSP, October, Denver, CO.

Oral Presentation, Lead author, "Impacts of the built environment on active travel: Evidence from 20 US metropolitan areas," ACSP, October, Denver, CO.

Oral Presentation, Student lead author, "Exploring travel affinity associated with travel modes and multitasking," ACSP, October, Denver, CO.

Poster Presentation, Lead author, "Using mobile sensing of air quality to design low-exposure bicycle routes," ACSP, October, Denver, CO.

Oral Presentation, Student lead author, "Incorporating area emission sources in land use regression models of volatile organic compounds," ISEE, September, Sydney, Australia.

Oral Presentation, Student lead author, "Assessing the impact of transport mode, trip purpose, and the built environment on mood using a smartphone app," ISEE, Sept., Sydney, Australia.

Oral Presentation, Student lead author, "Impacts of the built environment on active travel: Evidence from 20 US metropolitan areas," ISEE, September, Sydney, Australia.

Oral Presentation, Lead author, "Using mobile monitoring to develop hourly LUR models of particle number and black carbon concentrations," ISEE, September, Sydney, Australia.

Poster Presentation, Co-author, "Can street lighting promote physical activity after dark? An exploratory study," Illuminating Engineering Society, August, Austin, TX.

Poster Presentation, Co-author, "Assessing barriers and motivators for trail use in a college town," Southeast American College of Sports Medicine, February, Greenville, SC.

Poster Presentation, Co-author, "Monitoring shared-use paths: applying warrants for pedestrian hybrid beacons and traffic signals," TRB, January, Washington, DC.

Poster Presentation, Lead author, "Merging traffic monitoring and direct-demand modeling to assess spatial patterns of AADB and AADP," TRB, January, Washington, DC.

Poster Presentation, Co-author, "Exposure to risk and the built environment: empirical study of bicycle crashes in Minneapolis, MN," TRB, January, Washington, DC.

Poster Presentation, Student lead author, "Designing a bicycle and pedestrian traffic monitoring program to estimate AADT in a small rural college town," TRB, January, Washington, DC.

2016   *Poster Presentation*, Co-author, "Exposure to risk and the built environment, an empirical study of bicycle crashes in Minneapolis," US DOT-UTC, December, Washington, DC.

Poster Presentation, Co-author, "Exposure to risk and the built environment, an empirical study of bicycle crashes in Minneapolis," ACSP, November, Portland, OR.

Oral Presentation, Lead author (invited), "Designing Bicycle and Pedestrian Traffic Count Program to Estimate Performance Measures on Streets and Sidewalks in Blacksburg, VA," Transportation Planning Research Advisory Committee VDOT, November, Charlottesville, VA.

Poster Presentation, Lead author, "Land use regression models for active travel: Spatial estimates of walking and biking for exposure assessment," ISEE, September, Rome, Italy.

Poster Presentation, Lead author, "A real-time, mobile air quality monitoring platform for developing spatial models," ISEE, September, Rome, Italy.

Oral Presentation, Lead author, "Active travel and exposure to air pollution: Implications for transportation and land use planning," TPAQ, August, Minneapolis, MN.

Oral Presentation, Student lead author, "Designing a bicycle and pedestrian traffic count campaign in a small rural college town," NATMEC, May, Miami, FL.

Poster Presentation, Lead author, "Using temporal patterns of bicycle and pedestrian traffic to define factor groups," NATMEC, May, Miami, FL.

Oral Presentation, Lead author (invited), "Building clean, health-promoting cities: Making a case for active travel," Olmsted Seminar, Georgia Tech, March, Atlanta, GA.

Oral Presentation, Lead author, "Facility-demand models of pedestrian and bicycle traffic: A comparison of fully-specified and reduced-form models," TRB, January, Washington, DC.

Poster Presentation, Co-author, "Monitoring and modeling urban trail traffic: Validation of direct demand models in Minneapolis, MN and Columbus, OH," TRB, January, Washington, DC.

Oral Presentation, Lead author (invited), "A bicycle and pedestrian count program in Blacksburg, VA," MATS-UTC Webinar, January, Charlottesville, VA.

2015   *Oral Presentation*, Lead author, "Using facility-demand models to assess exposure to hazards: Non-motorized traffic, accidents, and air pollution," ACSP, October, Houston, TX.

Oral Presentation, Lead author, "Active travel and exposure to air pollution: Implications for planning healthy cities," ISEE, August, Sao Paulo, Brazil.

Oral Presentation, Lead author, "Land use regression models of particulate air pollution using mobile monitoring," ISEE, August, Sao Paulo, Brazil.

Poster Presentation, Lead author, "Exposure to on-road particulate air pollution while cycling," ISEE, August, Sao Paulo, Brazil.

Poster Presentation, Lead author, "Designing bicycle and pedestrian count programs," MATS University Transportation Center Annual Meeting, August, Wilmington, DE.

Oral Presentation, Co-author, "Physical Activity and Air Quality: a transdisciplinary research opportunity," Moving Active Transportation to Higher Ground, April, Washington DC.

Poster Presentation, Lead author, "Exposure to particulate air pollution while cycling," TRB, January, Washington, DC.

2014   *Oral Presentation*, Lead author, "Describing spatial patterns of non-motorized traffic: Models of bicycle and pedestrian traffic for use in practice," ACSP, October, Philadelphia, PA.

Oral Presentation, Lead author, "Modeling spatial patterns of bicycle and pedestrian traffic to estimate exposure to hazards," ISEE, August, Seattle, WA.

Oral Presentation, Co-author, "Air pollution and physical activity: what we need to know to inform public health decision making," ISEE, August, Seattle, WA.

Poster Presentation, Lead author, "Using objective measures of stove use and indoor air quality to evaluate a cookstove intervention in Uganda," ISEE, August, Seattle, WA.

Oral Presentation, Lead author, "Performance measures for urban trails: Minneapolis, MN," CTS, May, St. Paul, MN.

Poster Presentation, Lead author, "Measuring particulate air pollution exposure using a mobile bicycle-based platform," ALR, March, San Diego, CA.

Oral Presentation, Lead author, "Day-of-year scaling factors and design considerations for non-motorized traffic monitoring programs," TRB, January, Washington, DC.

Oral Presentation, Co-author, "Performance measures for urban trails: Minneapolis, MN," ACSP, October, Philadelphia, PA.

2013   *Oral Presentation*, Lead author, "Comparing spatial patterns of non-motorized traffic and particulate air pollution in Minneapolis, MN," ISEE, August, Basel, Switzerland.

Oral Presentation, Lead author, "Neighborhood walkability and air pollution exposure," ISEE, August, Basel, Switzerland.

Poster Presentation, Lead author, "Measuring and modeling particulate air pollution using a mobile, bicycle-based platform," ISEE, August, Basel, Switzerland.

Poster Presentation, Lead author, "Measuring particulate air pollution by bicycle," Bicycle Urbanism Symposium, June, Seattle, WA.

Oral Presentation, Lead author, "Measuring particulate air pollution using a mobile, bicycle-based platform: Implications for cyclists' and pedestrians' exposure to urban air pollution," ECTRI-FERSI Young Researcher Seminar, June, Lyon, France.

Oral Presentation, Lead author, "Measuring particulate air pollution using a mobile, bicycle-based platform," CTS, May, St. Paul, MN.

2012   *Poster Presentation*, Lead author, "Estimating use of non-motorized infrastructure: Models of pedestrian and bicycle traffic in Minneapolis," ALR, March, San Diego, CA.

Oral Presentation, Lead author, "Evaluating non-motorized transportation infrastructure in Minneapolis," CTS, May, St. Paul, MN.

2011   *Poster Presentation*, Lead author, "Health impacts of the built environment: within-urban variability in physical inactivity, air pollution, and heart disease," ISEE, Sept., Barcelona, Spain.

2010   *Oral Presentation*, Lead author, "Health impacts of the built environment: physical inactivity, air pollution, and ischemic heart disease in Los Angeles," ISEE, August, Seoul, Korea.

2009   *Oral Presentation*, Lead author, "Rural water supply in Masaka, Uganda," Central States Water Environment Association Annual Conference, May, Chicago, IL.

Oral Presentation, Lead author, "Future passenger-vehicle CO_2 emissions: Application of an urban scaling rule," TPAQ, July, Denver, CO.

2008   *Oral Presentation*, Lead author, "Reducing greenhouse gas emissions from transportation sources in Minnesota," Minnesota Public Transit Association, September, St. Paul, MN.

Media appearances and coverage

2020   Washington Business Journal. "Interview with Michael Neibauer on DC air quality." April 9. https://www.bizjournals.com/washington/news/2020/04/09/meet-steve-hankey-the-va-tech-professor-measuring.html

2018   Environmental Health Perspectives. "Active travel for all? The surge in public bike-sharing programs." August 3. https://ehp.niehs.nih.gov/doi/full/10.1289/EHP3754

WSLS news. "New bike share program to launch this summer in the NRV." June 25. https://www.wsls.com/news/virginia/new-river-valley/new-bike-share-program-to-launch-this-summer-in-the-nrv

2017   Artsenkrant, "Doordachte stadsplanning tegen luchtvervuiling (translation: Thoughtful city planning against pollution)."

2016   Environmental Monitor. "Weather bikes stand out in urban studies, advance science dialogue." Nov. 3. http://www.fondriest.com/news/weather-bikes-stand-urban-studies-advance-science-dialogue.htm

2013   Star Tribune. "His work may lead to cleaner cycling routes." July 25. http://www.startribune.com/local/blogs/216949181.html

2012   WCCO news. "Grad Student Researches Pollution Effects on Cyclists." September 26. http://minnesota.cbslocal.com/2012/09/26/u-of-m-grad-student-researches-pollution-effects-on-cyclists/

Advising and Mentoring

Current advising load

PhD chair or co-chair: 2; PhD committee: 5

MURP chair: 1

Undergraduate Independent Research Study

Complete

- Ross Zelenske (Public and Urban Affairs). Topic: Estimating bicycle centrality for Blacksburg, VA. Job after graduation: Planner I, City of Hickory, NC.
- Henry Cohen (Geography). Topic: Lidar data for measuring urban form. Job after graduation: Master's student, Urban and Regional Planning, University of Virginia.

Master's Student Advisees (Thesis only)

Complete

- Joe Niland (Chair; Urban and Regional Planning). Topic: Ecological Urban Revitalization; Baltimore, Maryland Case Study. Job after graduation: Associate of Landscape Architecture, Design Resource Group.
- Armin Yeganeh (Chair; Urban and Regional Planning). Topic: Accessibility, Equity, and the US Public Transit System. Job after Graduation: PhD student, VT.
- Tianjun Lu (Chair; Urban and Regional Planning). Topic: Designing a non-motorized traffic count campaign in a small rural college town. Job after Graduation: PhD student, VT.

Current

- Kuldeep Dixit (Chair; Urban and Regional Planning). Topic: Mobile monitoring of air quality for use in image-based empirical models.

Doctoral Student Advisees

Complete

- Huyen Le (Co-chair; Planning, Governance, and Globalization). Topic: Travel affinity, mood, and mode choice. Job after graduation: Assistant Professor, Ohio State University.
- Tianjun Lu (Chair; Planning, Governance, and Globalization). Topic: Urban form and air quality; national LUR models of air quality. Job after graduation: Assistant Professor, California State University – Dominguez Hills.
- Asmaa Al-Azmi (Co-chair; Civil and Environmental Engineering). Topic: Real-time Land Use Regression models. Job after graduation: Ministry of Transportation, Kuwait.

Current
- Meng Qi (Chair; Planning, Governance, and Globalization). Topic: Land Use Regression models of urban air quality using mobile monitoring.
- Sajjad Razkenari (Chair; Planning, Governance, and Globalization). Topic: Urban form and air quality.

University, Department, and Professional Service

2017-present   Member, Editorial Review Board for *Environmental Health Perspectives*: Responsible for reviewing articles submitted to EHP and reporting to Associate Editors on review process and outcomes.

2015-present   Member, Watershed Management Minor Committee: Responsible for teaching a core course in the minor. Participate in committee activities to ensure documentation and curriculum for the minor are current.

2014-present   Faculty Co-advisor, Engineers Without Borders: Advise EWB officer group on how best to engage funders and manage large organizations. Current EWB projects are located in Guatemala, Uganda, and Blacksburg.

2019-2020   Associate Chair – Urban Affairs and Planning program: Support UAP program chair in leadership of the UAP program including degree administration, faculty affairs, and university governance.

2018-2021   Director of PhD program – UEDP track: Responsible for coordinating admissions and funding for the UEDP track of the Planning, Governance, and Globalization degree.

2015-2020   Member, Town of Blacksburg "Corridor" Committee: Attend regular meetings of this Town of Blacksburg committee focused on bicycling and walking issues. Incorporate members of this committee in my service-learning courses and my research agenda.

2016-2019   Member, College of Architecture and Urban Studies Honorifics Committee: Attend regular meetings of this CAUS committee. Committee charge is to review and pick awardees for College-level alumni, student, and faculty awards.

2014-2018   Internship Coordinator, Urban Affairs and Planning: Organize internship activities: (1) distribute internship opportunities, (2) develop projects with sponsor organizations, and (3) ensure students are integrated into significant activities at sponsor organizations.

2014-2016   Chair, Master of Urban and Regional Planning Curriculum Committee: Chair of committee to reform the MURP degree. Regular meetings with faculty to map course and program learning objectives and determine consensus on a new degree structure.

Journal Reviewer: *American Journal of Preventive Medicine, Atmosphere, Atmospheric Environment, BMJ Open, Canadian Journal of Civil Engineering, Energy for Sustainable Development, Environment and Behavior, Environment Development and Sustainability, Environment International, Environmental Health, Environmental Health Perspectives, Environmental Pollution, Environmental Research, Environmental Science and Technology, Geophysical Research Letters, International Journal of Environmental Research and Public Health, Journal of Planning Education and Research, Journal of Transport Geography, Journal of Transport and Health, Journal of Transport and Land Use, Journal of Transportation Engineering, Journal of Urban Planning and Development, Landscape and Urban Planning, PeerJ, Science of the Total Environment, Sustainable Cities and Society, Transactions on Intelligent Transportation Systems, Transportation, Transport Reviews, Transportation Research Part A: Policy and Practice, Transportation Research Part D: Transport and Environment, Transportation Research Record,* and *Urban Climate*.

Grant Reviewer: *US Environmental Protection Agency; Natural Sciences and Engineering Research Council of Canada.*

Current Research Support

Built Environment Assessment through Computer VisiON (BEACON): Applying deep learning to street-level and satellite images to estimate built environment effects on cardiovascular health, NIH, 2020-2025, co-Investigator; VT Lead. Total budget: $3 million; share to VT: $466,276.

> *Research objective*: Develop novel measures of the built and natural environments using image-based techniques for use in health effects studies.

Northern Capital Region trail monitoring and analysis program, Department of Interior, 2020-2025, co-Investigator; VT Lead. Total budget: $500,000; share to VT: $143,991.

> *Research objective*: Work with stakeholder group of municipalities in the DC area (led by the National Park Service) to develop and maintain a trail traffic count program.

CAREER: Leveraging mobile monitoring, low cost sensors, and Google Street View imagery to identify and modify street-level determinants of exposure to particulate air pollution, NSF, 2020-2025, Principal Investigator. Total budget and share to VT: $500,000.

> *Research objective*: Combine emerging measurement techniques (mobile monitoring and low cost sensing) with new deep learning derived metrics of street features to develop LUR models.

Characterizing urban- and finer-scale spatiotemporal variability for select VOC Superfund compounds, NIH, 2017-2022, co-Investigator; VT Lead. Total budget: $6.6 million; share to VT: $69,291.

> *Research objective*: Employ mobile monitoring to assess the spatial variability of select VOC compounds in Louisville, KY. VOC concentrations will be compared with urinary metabolite samples to assess health impacts.

Center for Air, Climate, and Energy Solutions, US EPA, 2016-2022, co-Investigator; VT Lead. Total budget: $10 million; share to VT: $278,629.

> *Research objective*: Use mechanistic and statistical modeling approaches to detect regional differences for multiple pollutants in the continental US. Focus on developing tools to disseminate information on air quality and policy decisions that can reduce human exposure.

Past Research Support

Seeing the forest for the trees: Developing Google street view-based metrics of nature and the influence on health, NIH, 2019-2021, Co-Investigator. Total budget: $200,000; share to VT: $8,100.

> *Research objective*: Develop deep learning models to estimate features of nature from street level imagery; apply these nature metrics to several cohorts of school age children.

Urban green infrastructure for pedestrian health, The Center for Health and Nature (Houston Methodist/Texas A&M), 2019-2020, Co-Investigator. Total budget: $25,000.

> *Research objective*: Pilot project to develop methods to assess pedestrians' exposure to green space in urban areas.

Towards real-time air quality models: adding temporal precision to empirical models of air quality, ICTAS (VT), 2017-2019, Principle Investigator. Total budget (and share to VT): $79,820.

> *Research objective*: Add temporal precision to LUR models developed from mobile measurements using spatiotemporal traffic emissions estimates.

Air quality, asthma, and school absenteeism in Roanoke City public schools, Adaptive Brain DA, Virginia Tech, 2017-2018, co-Investigator. Total budget (and share to VT): $8,000.

> *Research objective*: Determine association among elevated ozone concentrations, asthma, and school absenteeism for all students in Roanoke City schools over a 3 year period.

Data science to develop urban form metrics using machine learning and longitudinal landsat imagery, Microsoft, 2018-2019, co-Investigator. Total budget (and share to VT): $20,000 (in computing credits).

> *Research objective*: Develop feasibility study of using landsat satellite imagery to predict urban form for the contiguous US.

Street noise relationship to vulnerable road user safety, Safe-D UTC, 2017-2018, co-Principal Investigator. Total budget: $54,066; share to VT: $20,352.

> *Research objective*: Explore use of a publicly available phone application to record noise levels by bicycle. Assess feasibility of using noise as a predictor of bicycle-vehicle crashes.

Planning for walking and cycling in an autonomous vehicle future, MATS-UTC, 2017-2018, co-Investigator. Total budget: $101,152; share to VT: $91,250.

> *Research objective*: Develop a structured interview protocol to survey practitioners regarding integration of cycling and walking in future transportation systems with autonomous vehicles.

Developing VOC land use regression models in Minneapolis, MN, City of Minneapolis, 2017-2018, Principal Investigator. Total budget (and share to VT): $6,300.

> *Research objective*: Investigate feasibility of developing LUR models for 60 VOCs from a community-led monitoring effort.

Multi-city, national-scale, direct-demand models of peak-period bicycle and pedestrian traffic, MATS-UTC, 2016-2017, Principal Investigator. Total budget (and share to VT): $89,232.

> *Research objective*: Compile a multi-city, national-scale database of bicycle and pedestrian traffic counts and develop direct-demand models of bicycle and pedestrian traffic volumes.

Mood state in transport environments: Assessing the impact of mode, purpose, and the built environment, ISCE (VT), 2016-2017, Principal Investigator. Total budget (and share to VT): $12,630.

> *Research objective*: Adapt a phone app (Daynamica) to assess mood state after completion of trips by participants and explore impact of transport mode and the built environment.

Designing a bicycle and pedestrian traffic count program to estimate performance measures on streets and sidewalks in Blacksburg, VA, MATS-UTC, 2014-2016, Principal Investigator. Total budget: $147,218; share to VT: $135,878.

> *Research objective*: Design a non-motorized traffic count campaign in Blacksburg, VA that adapts current DOT protocols for motor vehicles to estimate standard traffic engineering performance measures for bicycles and pedestrians.