

Exponent®
Engineering & Scientific Consulting

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Professional Profile

Ms. Hoekstra-Atwood is a human factors professional with expertise in evaluating human performance in traffic safety and critical systems. She conducts empirical research and analyses to evaluate how systems interact with users' attention, perceptual, and cognitive capabilities, and the impact of these interactions on human performance and overall system performance.

In her work, Ms. Hoekstra-Atwood has investigated issues related to information acquisition, diagnostic error, reaction time, decision-making, human-machine interface design, and driver behavior. She has applied her knowledge and experience to produce design guidelines, system specifications, and mitigation strategies to support driver performance, pedestrian safety, nuclear power plant technician diagnostic accuracy, and software accessibility. In addition, Ms. Hoekstra-Atwood has extensive experience analyzing and evaluating driver performance and safety using task analyses, eye trackers, driving simulators, and instrumented vehicles.

Ms. Hoekstra-Atwood earned a Master's degree in Industrial Engineering from the University of Toronto, with a focus on driver attention and distraction. Her research has been supported by various governmental and research agencies including the Federal Highway Administration, the National Highway Traffic Safety Administration, the Nuclear Regulatory Commission, the Federal Railroad Administration, and Toyota's Collaborative Safety Research Center.

Academic Credentials & Professional Honors

M.A.Sc., Mechanical & Industrial Engineering, University of Toronto, Canada, 2015

B.A.Sc., Honours Systems Design Engineering, University of Waterloo, 2012

Academic Appointments

Research Assistant, Human Factors and Applied Statistics Laboratory, University of Toronto, 2013-2015

Professional Affiliations

Transportation Research Board of the National Academies:

Member, ACD16 - Standing Committee on Human Factors

Human Factors and Ergonomics Society:

Member, 2014 - present

Association for Computing Machinery:

Reviewer, Automotive User Interfaces (AutomotiveUI)

Publications

Campbell, J.L., Hoekstra-Atwood, L., Monk, C., Fraser, A., Torbic, D. & Potts, I. (2024) Diagnostic assessment and countermeasure selection: A toolbox for traffic safety practitioners. (NCHRP Report 1111) Washington, DC: The National Academies Press. https://doi.org/10.17226/27890.

Hoekstra-Atwood L, Bennett M, Richard C M, & Cowger V C. 2023. Electronic Device Use: A Review of the Literature on Addictive Behaviors. DOT HS 813 461. National Highway Traffic Safety Administration, Washington, DC.

Manser M, Campbell J, Fincannon T, Krake A, Hoekstra-Atwood L, Crump C, & Wu L. 2023. Role of System Status Information in the Development of Trust and Mental Model in Automated Driving Systems. In 27th International Technical Conference on the Enhanced Safety of Vehicles (ESV), Paper No. 23-0342.

Hoekstra-Atwood, L., C.M. Richard, and V. Venkatraman. 2022. Multiple Sources of Safety Information from V2V and V2I: Phase II Final Safety Message Report. FHWA-HRT-22-013. Federal Highway Administration, Washington, DC.

Campbell, J. L., V. Venkatraman, L. Hoekstra-Atwood, J. Lee, and C. Richard. 2020. HMI design for automated, connected, and intelligent vehicles. In: Handbook of Human Factors for Automated, Connected, and Intelligent Vehicles. D.L. Fisher, W.J. Horrey, J.D. Lee, and M.A. Regan (eds). CRC Press.

Hoekstra-Atwood, L., J. L. Campbell, C. Hoover, B. Katz, and N. Kehoe. 2020. Use of color changeable message signs. FHWA-HOP-18-067. Federal Highway Administration, Washington, DC.

Baumgardner, G., L. Hoekstra-Atwood, and D. M. Prendez. 2020. Concepts of connected vehicle applications: Interface lessons learned from a rail crossing implementation. pp. 280–290 In: Proc. of the 12th International Conference on Automotive User Interfaces and Interactive Vehicular Applications.

Hoekstra-Atwood, L., D. M. Prendez, J. L. Campbell, and C. M. Richard. 2019. Some on-road glances are more equal than others: Measuring engagement in the driving task. In: Proc. of the Human Factors and Ergonomics Society 63rd Annual Meeting, Seattle, WA.

Hoekstra-Atwood, L., C. Hoover, and C. M. Richard. 2019. Benefits of redundant visual in-vehicle information in pedestrian-vehicle conflict scenarios. In: Proc. of the Transportation Research Board 98th Annual Meeting, Washington, D.C.

Magee, K., V. Venkatraman, L. Hoekstra-Atwood, and C. M. Richard. 2019. Effectiveness of diagrammatic guide signs at complex interchanges. In: Proc. of the Human Factors and Ergonomics Society 63rd Annual Meeting, Seattle, WA.

Chen, H. Y. W., L. Hoekstra-Atwood, and B. Donmez. 2018. Voluntary- and involuntary-distraction engagement: An exploratory study of individual differences. Human Factors, 60(4):575-588.

Hoekstra-Atwood, L., H. Y. W. Chen, and B. Donmez. 2017. A simulator study of involuntary driver distraction under different perceptual loads. Transportation Research Record, 2663:12-19.

Richard, C., L. Hoekstra-Atwood, B. H. Philips, and C. Jerome. 2017. Driver responses to incongruent V2V and V2I safety critical information in left-turn across path scenarios. In: Proc. of the Human Factors

and Ergonomics Society 61st Annual Meeting, Austin, TX.

Hoekstra-Atwood, L., H. Y. W. Chen, and B. Donmez. 2016. Driving under involuntary distraction and varied perceptual loads. In: Proc. of the Human Factors and Ergonomics Society 60th Annual Meeting, Washington, D.C.

Chen, H. Y. W., B. Donmez, L. Hoekstra-Atwood, and S. Marulanda. 2016. Self-reported engagement in driver distraction: An application of the Theory of Planned Behaviour. Transportation Research Part F: Psychology and Behaviour, 38:151-163.

Giang, W. C. W., L. Hoekstra-Atwood, and B. Donmez. 2014. Driver engagement in notifications: A comparison of visual manual interaction between smartwatches and smartphones. In: Proc. of the Human Factors and Ergonomics Society 58th Annual Meeting, Chicago, IL.

Hoekstra-Atwood, L., H. Y. W. Chen, W. C. W. Giang, and B. Donmez. 2014. Measuring inhibitory control in driver distraction. In: Proc. of the 6th International Conference on Automotive User Interfaces and Interactive Vehicular Applications, Seattle, WA.

Presentations

Baumgardner, G. 2021. Effective advanced warning for connected safety applications. Presented by L. Hoekstra-Atwood at the 18th International Road Federation World Meeting & Exhibition.

Baumgardner, G., L. Hoekstra-Atwood, and D. M. Prendez. 2020. Concepts of connected vehicle applications: Interface lessons learned from a rail crossing implementation. Presented at the 12th International Conference on Automotive User Interfaces and Interactive Vehicular Applications.

Hoekstra-Atwood, L., D. M. Prendez, J. L. Campbell, and C. M. Richard. 2019. Some on-road glances are more equal than others: Measuring engagement in the driving task. Presented at the Human Factors and Ergonomics Society 63rd Annual Meeting, Seattle, WA.

Hoekstra-Atwood, L., C. Hoover, and C.M. Richard. 2019. Benefits of redundant visual in-vehicle information in pedestrian-vehicle conflict scenarios. Presented at the Transportation Research Board 98th Annual Meeting, Washington, D.C.

Richard, C.M., L. Hoekstra-Atwood, B.H. Philips, and C. Jerome. 2017. Driver responses to incongruent V2V and V2I safety critical information in left-turn across path scenarios. Presented at the Human Factors and Ergonomics Society 61st Annual Meeting, Austin, TX.

Hoekstra-Atwood, L., H. Y. W. Chen, and B. Donmez, 2017. A simulator study of involuntary driver distraction under different perceptual loads. Presented at the Transportation Research Board 96th Annual Meeting.

Hoekstra-Atwood, L., H. Y. W. Chen, and B. Donmez, 2016. Driving under involuntary distraction and varied perceptual loads. Presented at the Human Factors and Ergonomics Society 60th Annual Meeting, Washington, D.C.

Hoekstra-Atwood, L., H. Y. W. Chen, W. C. W. Giang, and B. Donmez. 2014. Measuring inhibitory control in driver distraction. Presented at the 6th International Conference on Automotive User Interfaces and Interactive Vehicular Applications, Seattle, WA.

Lee, J., C.M. Richard, J.L. Campbell, J.L Brown, L. Hoekstra-Atwood, K. Magee, D. Prendez, and J.L. Schroeder. 2021. Principles and guidance for presenting active traffic management information to drivers. Washington, DC: The National Academies Press.