

Exponent®
Engineering & Scientific Consulting

David Prendez, Ph.D.

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Professional Profile

Dr. Prendez has contributed to over 25 projects involving human factors research and analysis, ergonomics evaluation, and human-machine interface design, providing expert analysis and consulting for federal agencies, state transportation departments, automotive OEMs, and academic research sponsors.

His work encompasses human factors experimental design and behavioral safety research, driver behavior analysis in automated vehicles, and vigilance measurement and prediction in safety-critical environments. His particular expertise lies in the application of human factors principles to the design and evaluation of complex systems across transportation and healthcare domains.

Dr. Prendez has served clients in transportation and highway safety, automotive technology, and clinical and healthcare environments, addressing challenges in driving engagement and takeovers in automated vehicles, human error risk in safety-critical systems, and vigilance decrement among susceptible work professionals, such as resident physicians. His consulting experience spans human-machine interface design and evaluation, user experience research and usability assessment, and the application of human factors guidelines and standards to real-world system design—including direct contributions to the Human Factors Guidelines for Road Systems.

Dr. Prendez's human factors consulting approach integrates controlled simulation and instrumented on-road experimentation-based methods, physiological and biometric data collection using wearable sensors and eye-tracking systems, and advanced statistical and machine learning modeling to deliver rigorous, defensible conclusions about human performance and system safety. In addition, his methodological toolkit includes structured literature reviews, human reliability analysis, probabilistic risk assessment, and the development of evidence-based design guidelines, enabling him to translate human factors research findings into actionable recommendations for system designers, policymakers, and safety stakeholders. He is proficient in using R, Python, MATLAB, and Java for research-grade data analysis and modeling.

Prior to joining Exponent, Dr. Prendez served as a Human Factors Engineer/Scientist at Battelle Memorial Institute where he conducted human factors assessments of driving and locomotive systems, evaluated driver monitoring technologies for the National Highway Traffic Safety Administration (NHTSA), led simulator experiments on driver engagement in automated vehicles, and authored technical reports for human factors projects on behalf of federal clients including Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and National Cooperative Highway Research Program (NCHRP). He also completed an internship at Amazon as a Research Scientist, where he developed automated noise simulation tools for worker safety during fulfillment center operations. Dr. Prendez earned his Ph.D., M.S., and B.S. degrees in Industrial Engineering from the University of Washington in Seattle.

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Academic Credentials & Professional Honors

Ph.D., Industrial Engineering, University of Washington, 2026

M.S., Industrial Engineering, University of Washington, 2024

B.S., Industrial Engineering, University of Washington, 2019

Academic Appointments

Graduate Research Assistant, Human and Systems Lab, University of Washington, 2024–2026

Graduate Research Assistant, Human Factors and Statistical Modeling Lab, University of Washington, 2022–2025

Graduate Teaching Assistant, IND E 250: Fundamentals of Engineering Economy, University of Washington, Autumn Quarter 2024

Undergraduate Research Assistant, Human Factors and Statistical Modeling Lab, University of Washington, 2017–2019

Prior Experience

Research Scientist Intern, Amazon.com, Inc., 2025

Human Factors Engineer/Researcher I-II, Battelle Memorial Institute, 2019–2022

Human Factors Intern, Battelle Memorial Institute, 2018–2019

Professional Affiliations

Member, Human Factors and Ergonomics Society

Reviewer, Human Factors and Ergonomics Society Annual Meeting Proceedings

Member, Institute for Operations Research and the Management Sciences

Member, Institute of Industrial & Systems Engineers

Publications

Prendez, D. M., Xing, Y., & Boyle, L. (accepted). Effects of Virtual Meetings on Drivers' Takeover Performance in Semi-Autonomous Vehicles. In Human Factors.

Douglas, G., Prendez, D. M., Mooney, S., & Boyle, L. (under review). Classification Patterns in Predictive Models for Pedestrian-Vehicle Crashes. In Analytical Methods in Accident Research.

Binjolkar, M., Prendez, D. M., & Boyle, L. (under review). Predicting Driver Distraction Using a Long Short-Term Memory Neural Network. In IEEE Transactions on Human-Machine Systems.

Prendez, D. M., Li, J., Higgins, E. A., & Kim, J. E. (2026). "Toward Sustainable Interventions for Enhancing Vigilance: A Scoping Review," Applied Ergonomics, 131, 104628. DOI: 10.1016/j.apergo.2025.104628

Prendez, D. M., Kettel, V., Higgins, E., Li, J., Kwon, Y., Roach, V., & Kim, J. E. (2025, September). "A Bayesian Network Approach for Modeling Resident Physician Vigilance," In Proceedings of the Human Factors and Ergonomics Society Annual Meeting (Vol. 69, No. 1, pp. 548-552). DOI: 10.1177/10711813251369394

Lim, C., Prendez, D. M., Boyle, L. N., & Rajivan, P. (2025). "The Impact of Cybersecurity Attacks on Human Trust in Autonomous Vehicle Operations," Human Factors, 67(5), 485-502. DOI: 10.1177/00187208241283321

Campbell, J. L., Hoekstra-Atwood, L., Fraser, A., Monk, C., Brown, J. L., Lee, J., Lichty, M. G., Prendez, D. M., Richard, C. M., Romo, A., Potts, I., Torbic, D., Graham, J., Harwood, D., Hutton, J., O'Laughlin, M., Transportation Research Board, & National Academies of Sciences, E., and Medicine. (2025). "Human Factors Guidelines for Road Systems: Third Edition," The National Academies Press. DOI: 10.17226/29158

Malarkey, D., Singh, R., Prendez, D. M., & MacKenzie, D. (2024). "Maintenance for Active Transportation Elements of Complete Streets," (Report submitted to WSDOT).

Malarkey, D., Prendez, D. M., MacKenzie, D., & MacArthur, J. (2024). "Policy Brief on Designing and Evaluating Electric-Bicycle Incentive Programs," Active Transportation Division Washington State Department of Transportation, March, 2024-06.

Prendez, D. M., Brown, J. L., Venkatraman, V., Textor, C., Parong, J., & Robinson, E. (2024). "Assessment of Driver Monitoring Systems for Alcohol Impairment Detection and Level 2 Automation," (Report No. DOT HS 813 577). National Highway Traffic Safety Administration. DOI: 10.17226/77647

Binjolkar, M., Prendez, D. M., & Boyle, L. (2023). "Detection of Driver/Occupant Status Phase 2 Final Report," (Report submitted to DENSO International America, Inc.).

Prendez, D. M., & Noble, A. M. (2022, September). "Driver engagement strategies for L3 ADS: a review of the literature," In Proceedings of the Human Factors and Ergonomics Society Annual Meeting (Vol. 66, No. 1, pp. 1452-1456). DOI: 10.1177/1071181322661259

Taylor, K. E., Prendez, D. M., Venkatraman, V., Brown, J. L., & Robinson, E. (2022). "SHRP 2 Implementation Assistance Program – Influence of Roadway Design Features on Episodic Speeding in Washington State: Design Guide," (Report submitted to WSDOT).

Brown, J.L., Prendez, D. M., Lee, J., Romo, A., Campbell, J.L., Hutton, J., Potts, I., & Torbic, D. (2021). "Guidelines for Road Systems 2021 Update, Volume 1: Updated and New Chapters," Washington, DC: The National Academies Press. DOI: 10.17226/26473

Brown, J.L., Prendez, D. M., Lee, J., Romo, A., Campbell, J.L., Hutton, J., Potts, I., & Torbic, D. (2022). "Human Factors Guidelines for Road Systems 2021 Update, Volume 2: Conduct of Research Report," Washington, DC: The National Academies Press. DOI: 10.17226/26474

Lee, J., Richard, C.M., Campbell, J.L., Brown, J.L, Hoekstra-Atwood, L., Magee, K., Prendez, D., and Schroeder, J.L. (2021). "Principles and Guidance for Presenting Active Traffic Management Information to Drivers," Washington, DC: The National Academies Press. DOI: 10.17226/25994

Hoekstra-Atwood, L., Bennett, M., Venkatraman, V., Brown, J. L., Taylor, K. E., Noble, A. M., Prendez, D. M., McDonough, J., Robinson, E., Lee, J., Dymond, B., & Richard, C. M. (2021). "State of Knowledge on Speeding," (Report submitted to NHTSA).

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

10.1145/3409120.3410640

Hoekstra-Atwood, L., Prendez, D. M., Campbell, J. L., & Richard, C. M. (2019, November). "Some on-road glances are more equal than others: Measuring engagement in the driving task," In Proceedings of the Human Factors and Ergonomics Society Annual Meeting (Vol. 63, No. 1, pp. 1986-1990). DOI: 10.1177/1071181319631450

Lecture, Panel, and Invited Speaking Presentations

Exploring Factors Influencing Resident Physician Vigilance Using Bayesian Networks. Lecture presentation at the Human Factors and Ergonomics Society 69th Annual Meeting, Chicago, IL: October, 2025.

Infrastructure, Transportation, and Society Sip & Chat. Panel discussion for the University of Washington Engineering Living Learning Community, Seattle, WA: May, 2025.

There and Back Again, An ISE's Tale. Invited speaker presentation for the University of Washington's Industrial & Systems Engineering Professional Practice Seminar, Seattle, WA: December, 2024.

Choosing Your Major. Panel discussion for the University of Washington College of Engineering First-year Interest Group, Seattle, WA: November, 2024.

Effects of Virtual Meetings on Drivers' Takeover Performance in Semi-Autonomous Vehicles. Poster presentation at the Human Factors and Ergonomics Society 68th Annual Meeting, Phoenix, AZ: September, 2024

Driver Engagement Strategies for L3 ADS: A Review of the Literature. Lecture presentation at the Human Factors and Ergonomics Society 66th Annual Meeting, Atlanta, GA: October 2022.

Concepts of Connected Vehicle Applications: Interface Lessons Learned from a Rail Crossing Implementation. Lecture presentation in The 12th International Conference on Automotive User Interfaces and Interactive Vehicular Applications (AutomotiveUI), Virtual: September, 2020.