



**Exponent**<sup>®</sup>  
Engineering & Scientific Consulting

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## Professional Profile

Dr. Wang holds degrees in Mechanical and Automotive Engineering, and a degree in Power Machinery and Engineering and is an associate in Exponent's Vehicle Engineering Practice. His education and professional background cover a wide range of mechanical engineering and automotive engineering topics including structure design, internal combustion engine (ICE) combustion and heat transfer, ICE gaseous and particle emissions, engine lubrication and cooling system, engine aftertreatment systems, and vehicle Noise, Vibration, and Harshness (NVH).

Dr. Wang is proficient conducting Finite Element Analysis (FEA) on engine components such as the engine block, liner, and piston-ring systems using Solidworks/Creo, Abaqus, and Hypermesh platforms. He specializes in multiphase, multidimensional modeling and computational analysis of engine lubrication, cooling, and aftertreatment systems by using tools that include Ansys, Fluent, AVL-Fire and MATLAB. Dr. Wang has extensive experience in analyzing engine lubricating oil degradation, and vehicle particle formation and emissions. Furthermore, he has years of experience working on aftertreatment system failure analysis using X-ray CT and Microscopes (TEM/SEM), specifically for both mid- and heavy-duty diesel and gasoline engine trucks, plus agricultural and construction machines. Dr. Wang has also conducted both experimental and modeling research on wet liner cavitation and corrosion failure for heavy-duty diesel engines in the past, which involves Fluid Dynamics, Fluid-Structure Interaction (FSI) and Vibration Modal Analysis.

Prior to joining Exponent, Dr. Wang worked at Sloan Automotive Laboratory, Massachusetts Institute of Technology (MIT) as a Postdoctoral Associate and then a Research Scientist. At MIT, Dr. Wang has been leading a research team that worked on heavy-duty engine durability failure analysis due to high oil consumption, poor cooling system design, and pre-mature aftertreatment system application. He also worked on hydrogen combustion engine (H2ICE) development that tackled problems with instable combustion, super knock, water-oil interaction and high NOx emission issues.

## Academic Credentials & Professional Honors

Ph.D., Power Machinery and Engineering, Tianjin University, 2017

M.S., Power Machinery and Engineering, Tianjin University, 2012

B.S., Thermal and Power Machinery Engineering, Shandong University of Technology, China, 2010

## Academic Appointments

Committee Member of Aftertreatment and Emissions-Society of Automotive Engineering since 2017

Editorial Board of International Journal of Green Energy since 2021

Technical Committee Member of International Green Energy Conference-2022/2023

Guest Editor of Atmosphere

Organizer of Japan Society of Automotive Engineers (JSAE)

## Prior Experience

Research Scientist, Sloan Automotive Laboratory, Mechanical Engineering, Massachusetts, Institute of Technology, 2022.2-2022.7

Postdoctoral Associate, Sloan Automotive Laboratory, Mechanical Engineering, Massachusetts, Institute of Technology, 2017.9-2022.1

## Professional Affiliations

American Society of Automotive Engineers (SAE)

The American Society of Mechanical Engineers (ASME)

## Languages

Chinese

Mandarin Chinese

## Publications

X Liang, B Zhao, K Wang, X Lv, Y Wang. (2022). "Impact of multi-injection strategies on morphology, nanostructure and oxidation reactivity of diesel soot particles." *Combustion and Flame* 237: 111854.

J Zhang, Y Wang, V Muldoon, S Deng. (2022). "Crude glycerol and glycerol as fuels and fuel additives in combustion applications." *Renewable and Sustainable Energy Reviews* 159:112206.

Y Wang, Y Chen, X Liang, P Tan, S Deng. (2021). "Impacts of lubricating oil and its formulations on diesel engine particle characteristics." *Combustion and Flame* 225: 48-56.

X Liang, Y Wang, Y Chen, S Deng, "Advances in Emission Regulations and Emission Control Technologies for Internal Combustion Engines", *SAE J. STEEP 2*, 101-119

Y Chen, Y Wang, L Pezzola, R Mussi, L Bromberg, J Heywood. (2021). "A novel low-cost tar removal technology for small-scale biomass gasification to power." *Biomass and Bioenergy* 149: 106085.

Y Wang, CJ Kamp, Y Wang, TJ Toops, C Su, R Wang, J Gong, VW Wong. (2020). "The origin, transport, and evolution of ash in engine particulate filters." *Applied Energy* 263: 114631.

Y Wang, Y Obuchi, J Zhang, I Tracy, V Wong. (2019). Experiments and analyses on stability/mid-channel collapse of ash-deposit wall layers and pre-mature clogging of diesel particulate filters, *SAE Technical Paper*.

Y Wang and V Wong. (2019). Quantitative analysis of ash density and ash distribution inside DPF honeycomb channels based on X-ray computed tomography, *SAE Technical Paper*.

Y Wang, X Liang, Y Wang, X Sun, H Yu, X Liu. (2017). Effects of Lubricating Oil Metallic Content on

Morphology, Nanostructure and Graphitization Degree of Diesel Engine Exhaust Particles, SAE Technical Paper.

Y Wang, X Liang, Y Wang, H Yu. (2017). "Effects of viscosity index improver on morphology and graphitization degree of diesel particulate matter." *Energy Procedia* 105: 4236-4241.

Y Chen, Y Wang, R Raine. (2017). "Correlation between cycle-by-cycle variation, burning rate, and knock: a statistical study from PFI and DISI engines." *Fuel* 206: 210-218.

Y Wang, X Liang, G Tang, Y Chen, L Dong, G Shu. (2017). "Impact of lubricating oil combustion on nanostructure, composition and graphitization of diesel particles." *Fuel* 190: 237-244.

Y Wang, X Liang, GQ Shu, Lihui Dong, H Yu, Y Wang, Z Li. (2016). "Effects of Lube Oil Sulfur and Ash on Size, Morphology and Element Composition of Diesel Particles." SAE Technical Paper.

Y Wang, X Liang, K Wang, Y Wang, L Dong, G Shu. (2016). "Effect of base oil on the nanostructure and oxidation characteristics of diesel particulate matter." *Applied Thermal Engineering* 106: 1311-1318.

Y Wang, X Liang, G Shu, L Dong. (2015). "Impact of lubricating oil on morphology of particles from a diesel engine." *Energy Procedia* 75: 2388-2393.

Y Wang, X Liang, G Shu, L Dong, X Sun, H Yu, Y Wang. (2015). "Effects of an anti-wear oil additive on the size distribution, morphology, and nanostructure of diesel exhaust particles." *Tribology International* 92: 379-386.

Y Wang, X Liang, G Shu, X Wang, J Bao, C Liu. (2014). "Effect of lubricating oil additive package on the characterization of diesel particles." *Applied Energy* 136: 682-691.

Y Wang, X Liang, G Shu, X Wang, X Sun, C Liu. (2014). "Effect of lubricant oil additive on size distribution, morphology, and nanostructure of diesel particulate matter." *Applied Energy* 130: 33-40.

## Presentations

Experiments and analyses on stability/mid-channel collapse of ash-deposit wall layers and pre-mature clogging of diesel particulate filters, 2019, SAE World Congress, Detroit.

Quantitative analysis of ash density and ash distribution inside DPF honeycomb channels based on X-ray computed tomography, 2019, SAE World Congress, Detroit.

Effects of Lube Oil Sulfur and Ash on Size, Morphology and Element Composition of Diesel Particles, 2016, SAE World Congress, Detroit.

Impact of lubricating oil on morphology of particles from a diesel engine, 2015, Abu Dhabi, UAE.

Experimental study the influence of EP antiwear additive on particle emissions in diesel engines, 2013, SAE World Congress, Detroit.

## Editorships & Editorial Review Boards

International Journal of Green Energy, Early Career Editorial Board, 2022

## Peer Reviews

Applied Energy, Applied Thermal Engineering, Fuel, Tribology International, SAE, JSAE, Emission Control Science and Technology, Atmosphere, Environmental Science & Technology