

Paul Shiller

EDUCATION

- PhD Physical Chemistry, Case Western Reserve University, Cleveland, OH, 1991.
MS Chemistry, Youngstown State University, Youngstown, OH, 1987.
MS Chemical Engineering, Case Western Reserve University, Cleveland, OH, 1984.
BE Chemical Engineering, Youngstown State University, Youngstown, OH, 1980.

APPOINTMENTS

- 2017 Research Assistant Professor, The University of Akron, Akron, OH, Civil Engineering Department.
2011 - 2017 Research Scientist, The University of Akron, Akron, OH, Civil Engineering Department.
2004 - 2011 Tribological Specialist, The Timken Co., Canton, OH
1998 - 2004 Senior Chemist, DELPHI Corporation, Warren, OH.

PUBLICATIONS

Journal Articles

- 2017 Doll, G., Fouts, J. A., **Shiller, P. J.**, Mistry, K. K., and Evans, R. D. Additive Effects on the Tribological Performance of WC/ α -C:H and TiC/ α -C:H coatings in boundary lubrication. *Wear*, 372-373, pp 104-115.
2017 Fouts, J. A., Fowler, B., **Shiller, P. J.**, and Doll, G. L. Chemical interactions of thiophene with ZnO and Al-doped ZnO thin films. *Surface and Coatings Technology*, 314, pp 55-66.
2017 Saatchi, A., **Shiller, P. J.**, Eghtesadi, S. A., Liu, T., and Doll, G. L. A Fundamental Study of Oil Release Mechanism in Soap and Non-soap Thickened Greases. *Tribology International*, 110, pp 333-340.
2015 Zolper, T., **Shiller, P.**, Jungk, M., Marks, T., Chung, Y.-W., Greco, G. A, Doll, G. L. and Wang, Q. Correlation of Polysiloxane Molecular Structure to Shear-Thinning Power-Law Exponent Using Elastohydrodynamic Film Thickness Measurements. *Journal of Tribology*, 137(3), pp. 031503–031503.
2011 Evans, R. D., **Shiller, P. J.**, and Howe, J. Y. Adhesion of tungsten carbide reinforced amorphous hydrocarbon thin films (WC/ α -C:H) to steel substrates for tribological applications. *Journal of Applied Physics*, 109(2), pp. 23518–6.
2011 Hager, J., C. H., Doll, G. L., Evans, R. D., and **Shiller, P. J.** Minimum quantity lubrication of M50/M50 and M50/Si₃N₄ tribological interfaces. *Wear*, 271(9–10), pp. 1761–1771.

- 2011 **Shiller, P.** Measuring the “Worms” in Grease. *NLGI Spokesman*, 74(6), pp. 18–26.
- 2010 Leonard, B., Sadeghi, F., Evans, R., Doll, G., and **Shiller, P.** Fretting of WC/ α -C:H and Cr₂N Coatings Under Grease-Lubricated and Unlubricated Conditions. *Tribology Transactions*, 53(1), pp. 145–153.
- 2003 Anderson, A. B., Sidik, R. A., Narayanasamy, J., **Shiller, P.** “Theoretical calculation of activation energies for $\text{Pt} + \text{H}(\text{aq}) + e^-(U) \leftrightarrow \text{Pt-H}$: Activation energy-based symmetry factors in the marcus normal and inverted regions”. *Journal of Physical Chemistry B* 107.19, pp. 4618–4623.
- 2002 Anderson, A., Neshev, N., Sidik, R., and **Shiller, P.** Mechanism for the electrooxidation of water to OH and O bonded to platinum: quantum chemical theory. *Electrochimica Acta*, 47(18), pp. 2999–3008.

Book Chapters

- 2016 **Shiller, P.** Chapter 6: Which Grease to Use When. In W. Tuszynski (Ed.), *NLGI: Lubricating Grease Guide*. Kansas City, MO: NLGI.

Patents

- 2017 **Shiller, P. J.** On-engine device using exhaust gas heating to crack gasoline and use vortex separation to yield a high hydrogen content fuel. Provisional patent.
- 2016 **Shiller, P. J.**, and Hager, C. H. Boron soap compounds for lubricating grease compositions. International Patent Application Serial No. PCT/US2016/053129.
- 2013 Doll, G., Drechsler, P., Hager, C. H., Evans, R., and **Shiller, P.** Anti-fretting rust preventative solution used for non-lubricated contact surfaces of bearing assembly, comprises rust preventative fluid and anti-fretting additive dissolved in fluid and comprising surface active compound. Patent Number: WO2013141959-A1.
- 2012 Evans, R., **Shiller, P.**, Pierman, D., and Doll, G. Apparatus and Method for Controlled Release of Lubricant Additives in Bearings and Gear Assemblies. Patent Number: US20120170883-A1.
- 2007 Kuppuraju, S., Fox, G. P., Borrowski, R., Pontius, T., and **Shiller, P.** Spherical roller bearing assembly has sealing materials which are carried by seal case bears against sealing surface on inner race to form multi stage sealing contact. Patent Number(s): WO2007127851-A1; EP2181272-A1; US2010150486-A1.

HONORS AND AWARDS

- 2016, 2017 Outstanding STLE Small Local Section Award, Canton section, executive committee member
- 2015 ASME Best Paper Award, Journal of Tribology; Zolper, T., **Shiller, P.**, Jungk, M., Marks, T., Chung, Y.-W., Greco, G. A, Doll, G. L. and Wang, Q. Correlation of Polysiloxane Molecular Structure to Shear-Thinning Power-Law Exponent

Using Elastohydrodynamic Film Thickness Measurements. *Journal of Tribology*, 137(3), pp. 031503–031503.

2009 Shell Award for Instructor Excellence, National Lubrication Grease Institute

GRANTS

University of Akron

- 2018-2019 NLGI Research Grant, “A Fundamental Examination of Grease Thickener Self-Assembly,” PI, \$49225.
- 2017- 2020 Center for Surface Engineering and Lubrication Research, “Oil Separation in Greases,” PI, \$120000.
- 2016 - 2017 The Timken Company, “Develop Boron Soap Thickened grease,” coPI, \$225000.
- 2015 - 2018 Center for Surface Engineering and Lubrication Research, “Lubrication Additive Activation,” PI, \$120000.
- 2016 Novus Co., “Investigate the thermal cracking characteristics with respect to gasoline reformulation,” coPI, \$10000.
- 2016 OMNOVA Solutions, “Rheological and tribological studies of a fluorinated lubricant additive,” coPI, \$15000.
- 2012 - 2015 The Timken Company, “Properties of Lubricants Related to Bearing Performance,” coPI, \$225000.
- 2012 - 2015 The Timken Company, “Fundamental Studies of Tribological and Solid Lubricant Coatings,” coPI, \$225000.

CONFERENCE ACTIVITY

Oral Presentations

- 2018 **P. Shiller**, Initial Steps of lithium soap grease thickener agglomeration, NLGI Annual Meeting, June 9-12.
- 2018 K. Mistry and **P. Shiller**, Grease selection for mainshaft bearing in the wind turbines: Connecting field trials to application testing, NLGI Annual Meeting, June 9-12
- 2018 **P. Shiller**, M. Seeley, E. Tully, and G. Doll, Lubricant Additive Surface Interactions: Organic Polysulfides, STLE Annual Meeting, May 12-24.
- 2016 B. LotfizadehDehkordi, G. Doll, **P. Shiller**, K. Mistry, High Pressure Viscosity and Tribology of Lubricants with Viscosity Modifiers Additives, STLE Annual Meeting, May 16-18.
- 2016 A. Saatchi, **P. Shiller**, K. Mistry, C. Hager, G. Doll, Fretting and Scuffing Wear

- of Grease Lubricated Bearing Steel Contacts, STLE Annual Meeting, May 16-18.
- 2016 **P. Shiller**, M. Smith, G. Doll, A. Greco, Pressure Dependence of Wind Turbine Gearbox Oil Viscosity, STLE Annual Meeting, May 16-18.
- 2016 J. A. Fouts, B. Tury, **P. J. Shiller**, T. W. Scharf, G. L. Doll, Evaluation of ZnO and Al-Doped ZnO Thin Films as Sensor Materials for Sulfur Concentrations in Fuel, Society of Vacuum Coaters Technical Conference, May 10-13.
- 2015 J. Fouts, G. Doll, R. Evans, and **P. Shiller**, On the Tribochemical Wear of Hydrogen-Containing Diamondlike Carbon in Oils with EP Additives, STLE Annual Meeting, May 17-21.
- 2015 B. LotfizadehDehkordi, G. Doll, A. Martini, K. Mistry, U. Ramasamy, and **P. Shiller** Pressure-Temperature Viscosity Measurements and Simulations of Polymer Additives in Lubricant, STLE Annual Meeting, May 17-21.
- 2015 A. Saatchi, G. Doll, K. Mistry, and **P. Shiller**, Studies of the Oil Release Mechanism in Non-Soap Thickened Grease, STLE Annual Meeting, May 17-21.
- 2014 B. LotfizadehDehkordi, B. Tury, **P.J. Shiller**, G.L. Doll, High pressure- and temperature-dependent viscous anomalies in polymer oil mixtures, Society of Rheologists Annual Meeting, Oct. 5-9.
- 2013 **Shiller, P.**, Measuring the “Worms” in Grease, NLGI Annual Meeting, June 15-18.
- 2012 **Shiller, P.**, Hager, C., The Effects of Grease Composition on Fretting Wear, Presented at the 67th STLE Annual Meeting, May 6-10.
- 2008 **Shiller, P.**, The Effects of Boron Additives in Grease on Fretting Wear, NLGI Annual Meeting, June 7-10.
- 2003 Anderson, Alfred B.; Sidik, Reyimjan A.; Narayanasamy, Jayakumar; **Shiller, Paul** Theoretical Calculations of Activation Energies for $\text{Pt} + \text{H}(\text{aq}) + \text{e}^-(\text{U}) \leftrightarrow \text{Pt} - \text{H}$: Activation Energy-Based Symmetry Factors in the Marcus Normal and Inverted Regions. 225th ACS National Meeting, March 23-27.
- 2002 Sidik, R. A.; J. Narayanasamy; Anderson, A. B. and **Shiller, P.** Quantum Mechanical Calculations of the Symmetry Factors for the Underpotential Deposition of Hydrogen and its Oxidation on Pt, 223rd ACS National Meeting, April 7-11.

Poster Presentations

- 2018 G. Babakhanova, Y. M. Golestani, T. Turiv, S. Afghah, H. Baza, H. Yu, Q. Wei, **P. Shiller**, R. Selinger, A.P.H.J. Schenning, D. J. Broer, and O. D. Lavrentovich, Thermo-responsive liquid crystal Elastomers Containing Disclinations, 27th International Liquid Crystal Conference, Kyoto, Japan, July 22-27.
- 2018 G. Babakhanova, T. Turiv, H. Yu, I. Chaganava, Q. Wei, **P. Shiller**, A.P.H.J. Schenning, D. J. Broer, and O. D. Lavrentovich, Self-assembly of colloids on photoresponsive liquid crystal coatings containing line defects, 27th International Liquid Crystal Conference, Kyoto, Japan, July 22-27.
- 2016 M.A. Seeley, **P. Shiller**, G. Doll, Additive Interactions on Surfaces via Temperature Programmed Desorption, STLE Annual Meeting Student Poster Presentation, May 16-18.
- 2016 A. Saatchi, **P. Shiller**, G.L. Doll, K. Mistry, A Fundamental Study of Bleed Mechanism in Fretting Contact, STLE Annual Meeting Student Poster Presentation; Platinum award winner, May 16-18.
- 2015 B. LotfizadehDehkordi, G. Doll, A. Martini, K. Mistry, U. Ramasamy, and **P. Shiller**, Pressure-Temperature Viscosity Measurements and Simulations of Lubricants with Polymer Additives, STLE Annual Meeting Poster Session, May 17-21.
- 2014 B. LotfizadehDehkordi, B. Tury, **P.J. Shiller**, G.L. Doll, Temperature Dependent, High Pressure Viscosity Measurements of PAO/Polymer Mixtures, STLE Annual Meeting Student Poster Presentation, May 18-22.
- 2014 A. Saatchi, B. Tury, **P.J. Shiller**, G.L. Doll, The Effect of Bleed Rate on Sliding and Rolling Contact Fretting Wear, STLE Annual Meeting Student Poster Presentation, May 18-22.
- 2014 J. Fouts, B. Tury, **P.J. Shiller**, G.L. Doll, Wear of WC/ α :CH Coatings with Common Gearbox Oil Additives, STLE Annual Meeting Student Poster Presentation, May 18-22.

TEACHING EXPERIENCE**The University of Akron**

Basic Chemistry, Lecture and lab, (4 terms).

Society of Tribologists and Lubrication Engineers

Advanced Lubrication 302: Advanced Lubrication Regimes, (1 year).

NLGI Grease 101, (3 years).

Basic Lubrication 102: Basic Applications, (7 years).

National Lubricating Grease Institute

Condition Monitoring, (5 years).
Advanced Lubrication, (7 years).
Basic Lubrication, (7 years).

Kent State University

Basic Organic Chemistry, (8 terms).
Fundamentals of Chemistry, (10 terms).
Chemistry in Our World, (3 terms).

SERVICE

To Profession

ASTM D02 Committee.
ACS Division of Colloids and Surface Chemistry, Alternate Councilor.
STLE Lubrication Fundamentals technical committee.
STLE Canton Section Executive Committee.
STLE Lubrication Specialist Education and Training Committee.
STLE Grease Technical Committee.

To University

2017 – 2020 Appointed to Faculty Senate Committee on Faculty Research.
2016 -- 2017 Appointed to Faculty Senate Committee on Interdisciplinary Initiatives.

Extra Training

2015 University of California, Berkeley QM/MM Workshop on Molecular Modeling.

Outreach

Tribology 101, Developed and presented a 2 ½ day workshop covering the fundamentals of tribology. (4 years)

Fundamentals of Tribology, Developed the “Grease” section for the STLE course and presented this at the inaugural event September 2017.

Webinars

Bearing Damage Analysis.
Grease Selection for Rolling Element Bearings.
Grease and Oil Lubrication Failure Analysis.
Bearing Damage Analysis Part II: Beyond Rolling Elements.
Grease Chemistry: Micelle Formation

PROFESSIONAL MEMBERSHIPS

American Chemical Society (ACS).

Society of Tribologists and Lubrication Engineers (STLE).

Society of Rheologists (SOR).