Postdoctoral Position: Oxide Nanoparticles as Lubricant Additives

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE at the UNIVERSITY OF PENNSYLVANIA invites applications for a full-time position as a Postdoctoral Researcher in the DEPARTMENT OF MECHANICAL ENGINEERING AND APPLIED MECHANICS in the laboratory of Prof. Robert W. Carpick (http://carpick.seas.upenn.edu).

The goal of the position is to conduct research into lubricant fluids containing zirconia nanocrystal additives. In particular, the candidate will study the microscopic composition and the formation process of tribofilms produced by sliding surfaces in fluids that contain reactive co-additives on steel surfaces, with a view toward application in gears including those in wind turbines. These studies are aimed at understanding the mechanisms of how the tribofilms form, and how the co-additives influence tribofilm formation and properties, with a goal of determining optimal additive formulations for wear protection. This will involve directly performing and analyzing experiments using macroscopic tribometry, and atomic force microscopy in liquid. In addition, imaging and spectroscopy analysis using analytical electron microscopy, Raman spectro-microscopy, x-ray photoelectron spectroscopy, and ToF-SIMS analysis will be conducted. The project involves interdisciplinary collaboration and significant interactions with commercial and national laboratory partners.

Applicants should be highly fluent in spoken and written English, and be able to work independently and collaboratively. The candidate should be highly organized, motivated, and driven. Applicants must have a doctoral degree in engineering or a related discipline, and must have extensive experience in tribology research. Experience with atomic force microscopy in fluids is highly desirable. Experience with other experimental techniques including scanning and transmission electron microscopy including analytical methods (EDS, EELS), focused ion beam milling, XPS, and Raman microscopy is also highly desirable. Experience with tribometry including the mini-traction machine (MTM), and with elastohydrodynamic lubrication theory, is valuable.

Applicants should submit their applications by email to carpick@seas.upenn.edu with the subject line, “Oxide Nanoparticle Postdoc Position”. Include a cover letter that summarizes prior research fields and experience, and that addresses the qualifications for the position with respect to the description above. Also include a CV with a list of published work, 2 representative publications, and the names and contact information of at least 3 references.

The University of Pennsylvania is an affirmative action/equal opportunity employer. All qualified applicants will receive consideration for employment and will not be discriminated against on the basis of race, color, religion, sex, sexual orientation, gender identity, creed, national or ethnic origin, citizenship status, disability, veteran status, or any other characteristic protected by law.