Hong Guo

Rochester Institute of Technology

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EDUCATION

Rochester Institute of Technology, Rochester, NY

PhD Candidate in Engineering 09/2016 – Expected 05/2021

Jinan University, Guangzhou, China

M.S. in Functional Metal Materials 06/2014

Zhengzhou University, Zhengzhou, China

B.E. in Metal Materials and Engineering 07/2010

SKILLSETS

- *Materials characterizations* - XRD, NMR, FTIR, DSC, TGA, SEM, EDS, TEM, Raman Spectroscopy, etc.
- *Instrument operation* - pin-on-disk tribometer, ball-on-flat reciprocating tribometer, 3D-profilometer, conductivity meter, viscometer, hardness tester, nano-indenter, contact angle goniometer, optical microscope, tube furnace, resistance furnace, wire cutting machine, impact abrasive wear testing machine, etc.
- *Computer simulation and data analysis* - ACD/ChemSketch, Avogadro, Microsoft Word, Excel, PowerPoint, MATLAB, Origin, Auto CAD, SOLIDWORKS, Ansys, Abaqus.
- *Program* - C++, Python.

JOURNAL ARTICLES

1) **Hong Guo** and Patricia Iglesias. Tribological behavior of ammonium-based protic ionic liquid as additive. *Friction*. 2021, 9 (1):169-178.
2) J.L. Viesca, P. Oulego, R. González, **Hong Guo**, A. Hernández Battez, P. Iglesias. Miscibility, corrosión and environmental properties of six hexanoate- and sulfonate-based protic ionic liquids. *Journal of Molecular Liquids.* 2021, 322:144561.
3) **Hong Guo**, Fanghua Chen, Rui Liu, and Patricia Iglesias. Lubricating Ability of Magnesium Silicate Hydroxide-Based Nanopowder as Lubricant Additive in Steel-Steel and Ceramic-Steel Contacts. *Tribology Transaction*. 2020, 63 (4):585-594.
4) **Hong Guo**, Junru Pang, Angela Rina Adukure, Patricia Iglesias. Influence of hydrogen bonding and ionicity of protic ionic liquids on lubricating steel-steel and steel-aluminum contacts: potential ecofriendly lubricants and additives. *Tribology Letters*. 2020, 68 (4):1-10.
5) **Hong Guo**, Thomas Smith, and Patricia Iglesias. The study of hexanoate-based protic ionic liquids used as lubricants in steel-steel contact. *Journal of Molecular Liquids*. 2019, 299:112208.
6) **Hong Guo,** Angela Rina Adukure, Patricia Iglesias. Effect of Ionicity of Three Protic Ionic Liquids as Neat Lubricants and Lubricant Additives to a Biolubricant. *Coatings*. 2019, 9 (11):713-728.

7) Akshar Patel, **Hong Guo,** and Patricia Iglesias. Study of the lubricating ability of protic ionic liquid on an aluminum-steel contact. Lubricants. 2018, 6(3),66.
8) Leah Matczak, Cammie Johanning, Emmanuel Gil, **Hong Guo**, Thomas W. Smith, Michael Schertzer, and Patricia Iglesias. Effect of cation nature on the lubricating and physicochemical properties of three ionic liquids. *Tribology International*. 2018, 124:23-33.

PEER-REVIEWED CONFERENCE PROCEEDINGS

1) **Hong Guo**, and Patricia Iglesias. Tribological properties of ammonium protic ionic liquids as additives in polyalphaolefin for steel-steel contact. *Proceedings of the ASME 2019 International Mechanical Engineering Congress and Exposition*.
2) Sameer A. Magar, **Hong Guo**, and Patricia Iglesias. Ionic liquid as cutting fluid additive using minimum quantity lubricant (MQL) in titanium-ceramic contact. *Proceedings of the ASME 2019 International Mechanical Engineering Congress and Exposition*.
3) **Hong Guo**, Steven Keil, John Ackerman, Ivan Puchades, Brian Landi, and Patricia Iglesias. The effects of single-walled carbon nanotubes and ionic liquids in reduction of friction and wear. *Proceedings of the ASME 2018 International Mechanical Engineering Congress and Exposition*.
4) Sameer Magar, **Hong Guo**, and Patricia Iglesias. Estimation of energy conservation in internal combustion engine vehicles using ionic liquid as an additive. *Proceedings of the ASME 2018 International Mechanical Engineering Congress and Exposition*.
5) **Hong Guo**, Rui Liu, Alfonso Fuentes-Aznar, and Patricia Iglesias. Friction and wear properties of halogen-free and halogen-containing ionic liquids used as neat lubricants, lubricant additives and thin lubricant layers. *Proceedings of ASME 2017 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*.

BOOK CHAPTER

1) **Hong Guo** and Patricia Iglesias. (2021). Ionic liquids as high-performance lubricants and lubricant additives. In S. M. Sohel Murshed (Eds.), Ionic Liquids - Thermophysical Properties and Applications. IntechOpen. (*Accepted*)

ORAL PRESENTATIONS IN CONFERENCES

1) **Hong Guo** and Patricia Iglesias. Investigation of Protic Ionic Liquids Used as Lubricants. *2019 STLE Tribology Frontiers Conference. October 22, 2019*
2) **Hong Guo** and Patricia Iglesias. The Study of Hexanoate-based Protic Ionic Liquids Used as Lubricants in Steel-steel Contact. *2019 Graduate Showcase at Rochester Institute of Technology*
3) **Hong Guo** and Patricia Iglesias. Tribological Behavior of Ammonium-based Protic Ionic Liquids as Additives. *2018 Graduate Showcase at Rochester Institute of Technology*

POSTER PRESENTATIONS IN CONFERENCES

1) Junru Pang, **Hong Guo** and Patricia Iglesias. Study of tribological properties of titanium with Laser Micro Textures under lubricating conditions. 2020 STLE Tribology Frontiers Virtual Conference. *November 9-13, 2020.*

2) Brandon Stoyanovich, **Hong Guo** and Patricia Iglesias. Protic ionic liquids as neat lubricants and lubricant additives. 2020 STLE Tribology Frontiers Virtual Conference. *November 9-13, 2020.*
3) **Hong Guo** and Patricia Iglesias. Investigation of ionic liquids as neat lubricants, additives of lubricants and thin-film lubricant layers. *21st International Conference on Wear of Materials. March 26-30,* 2017
4) Ryan Liu, Paarth Mehta, **Hong Guo**, Christopher Saldana and Patricia Iglesias. Tribological Properties of Textured Surfaces created using Modulation Assisted Machining for Steel-Aluminum Contact. *21st International Conference on Wear of Materials. March 26-30, 2017*
5) **Hong Guo** and Patricia Iglesias. Investigation of ionic liquids as neat lubricants, additives of lubricants and thin-film lubricant layers. *2017 Graduate Symposium and Showcase at Rochester Institute of Technology*

RESEARCH EXPERIENCE

Rochester Institute of Technology ----- *2016 – Present*

Research Assistant & Teaching Assistant, Tribology Laboratory

- Lead experimental design for various materials synthesis and molecular structure characterizations.
- Investigated the wettability, temperature-dependent viscosity, thermal, and ion association behavior of materials.
- Evaluate the mechanical and tribological properties of different metals and alloys.
- Perform characterization tests on metal surfaces to elucidate their mechanical damage behavior, wear mechanisms, and surface & interface interactions between metals with external liquid media.
- Analyze research data and present findings at review meetings every week.
- Report annual research summaries to the Gleason Doctoral Fellowship committee and publish research papers.

Dissertation*: Lubricating and Wear Mechanisms of Sliding Steel-Steel and Aluminum-Steel Contacts: Protic Ionic Liquids as Neat Lubricants & Lubricant Additives to Nonpolar and Polar Base Oils.*

Other Projects*:*

1. *Lubricating Ability of Magnesium Silicate Hydroxide-Based Nano-powder as Lubricant Additive in Steel-Steel and Ceramic-Steel Contacts.*
2. *The effects of single-walled carbon nanotubes and ionic liquids in reduction of friction and wear.*

Jinan University, Guangzhou, China ----- 2011 – 2014

Research Assistant, China Foundry Industry Engineering Research Center for Wear Resistant Materials

Thesis*: The Study of Microstructure, Hardness, Toughness and Wear Resistance of the Medium-carbon Low-alloy Steels with Nickel.*

Project*: Grain Refinement Effects of New Al-Ca-C Master Alloy on AZ91 Magnesium Alloy.*

Zhengzhou University, Zhengzhou, China ----- 2006 – 2010

Research Assistant, College of Materials Science and Engineering.

Thesis*: The Study of Organization and Micro-hardness of Mg18Zn3Y (Mg 79%, Zn 18%, Y 3%, wt. %) in Different States.*

MENTORING EXPERIENCE

Mentored Research Program ----- 2019 Fall - 2021 Spring

Support graduate and undergraduate students (6 students in total) with creative projects, experimental training, and data analysis methods; worked closely with them on publishing papers; assisted two of them to participate in the STLE conference 2020 and prepare poster presentations.

PROFESSIONAL ENGAGEMENTS

Manuscript Review

- Wear of Materials 2021-present
- Tribology International 2020-present
- Bulletin of the Korean Chemical Society 2020-present
- ASME International Mechanical Engineering Conference & Exposition (IMECE) 2019-present

Conference Activity

- Co-Chair of Materials Processes and Characterization: *ASME International Mechanical Engineering Conference & Exposition (IMECE)* 2018

MEDIA COVERAGE

- "Getting in Gear: Research at RIT improves gear design, materials and manufacturing operations." RIT News Interview - 2020
- "Ionic Liquids: Advanced Lubricants and Lubricant Additives." Magazine Invitation from Rochester Engineering Society - June 2020

AWARDS

1. Gleason Doctoral Fellowship, 2017-2021, USA
2. The Best Oral Presentation (Graduate Showcase) in Rochester Institute of Technology, 2019, USA
3. Top Grade Scholarship of Jinan University in 2013, 2012, P.R.C
4. Third Grade Scholarship of Zhengzhou University in 2009, P.R.C
5. Excellent Student Cadre in Jinan University in 2013, P.R.C

OUTREACH ACTIVITIES

- Co-organized lab activity for *WE're in Motion* and *ECCO Experience*- Summer 2019
- Organized activities to deliver knowledge about tribology to the public at *Imagine RIT 2018*
- Co-organized lab activity for K-12 Outreach Activity - 2017