

Chang-Dong Yeo, PhD

CONTACT

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EDUCATION

Ph.D. Mechanical Engineering, University of Illinois at Urbana-Champaign, 2008
(Advisor: Andreas A. Polycarpou)

B.S./M.S. Mechanical Engineering, Yonsei University (Seoul, Korea), 1996/1998

PROFESSIONAL EXPERIENCE

September 2015 – Present

Associate Professor, Department of Mechanical Engineering, Texas Tech University

August 2009 – 2015 August

Assistant Professor, Department of Mechanical Engineering, Texas Tech University

April 2008 – August 2009

Staff R&D Engineer, Seagate Technology LLC

August 2004 – April 2008

Research Assistant, Department of Mechanical Engineering, University of Illinois at Urbana-Champaign

January 1998 – July 2004

Senior R&D Engineer, Samsung Electronics Co. Ltd.

RESEARCH INTERESTS

- Multi-scale contact mechanics of engineering materials
- Integrated research on mechanics and magnetic/electrical performance of materials
- Atomic interaction and bonding of organic chemicals: Hydrocarbon and Ionic Liquid
- Dynamic adhesion mechanics of thin films and biomaterials

GRANTS AND CONTRACTS

- **Principal Investigator (Active)**, “Collaborative: Effect of Microstress and Frictional/Adiabatic Heat on Magnetic Property of Ferromagnetic Thin Film,” National Science Foundation (NSF), Project Period 4/15/2015 – 4/14/2018, Project Budget \$296,771.
- **Principal Investigator (Active)**, “Organic Contaminants in HDI: Formation, Growth, and Mechanical Collision,” Seagate Technology, Project Period 10/01/2014 – 9/31/2016, Project Budget \$170,000.
- **Principal Investigator (Active)**, “Mechanical Induced Magnetic/Electrical Failures of Head and Media,” Seagate Technology, Project Period 10/01/2013 – 9/31/2015, Project Budget \$85,000.
- **Principal Investigator (Completed)**, “Microwear Mechanism of Carbon Film under Extremely High Speed Surface Contact accounting for Phase Transition and Oxidation,” National Science Foundation (NSF), Project Period 9/01/2012 – 8/31/2014, Project Budget \$169,376.

- **Principal Investigator, (Completed)** "Thermo-magneto-mechanical Contact Performance of Ferromagnetic Thin Films," Texas Tech University, Project Period, 9/01/2013 – 8/31/2014, Project Budget \$4,500.
- **Principal Investigator (Completed)**, "Integrated Research on Thermo-Mechanical Contact Performance of Head Slider in HDD," Seagate Technology, Project Period 9/01/2012 – 8/31/2013, Project Budget \$84,857.
- **Principal Investigator (Equipment)**, Atomic Force Microscope made by NanoSurf @Mobile S, Samsung Information Systems America (San Jose, CA), Original price ~\$120,000.
- **Principal Investigator (Equipment)**, VENA VS90 made by VENA systems, Seagate Technology (Bloomington, MN), Original price ~\$200,000.

HONORS AND AWARDS

- Faculty Fellow for the Air Force Summer Faculty Fellowship Program, 2014 & 2012
- President's Academic Achievement Award, Texas Tech University, Nominated by College of Engineering, 2013
- NSF BRIGE Award, 2012
- Schaller Fund Graduate College Travel Grant, UIUC, 2007
- Outstanding Engineer of the Year 2000, Samsung electronics Co. Ltd, 2001
- Samsung Scholarship Program Award, Samsung electronics Co. Ltd, 1996-1998

JOURNAL PUBLICATIONS

A. PUBLISHED

1. J. Song, S. Lee, J. Lee, and **C.-D. Yeo**, "Atomic Degradation and Wear of Thin Carbon Films under High Speed Sliding Contact using Molecular Dynamics Simulation," *Tribology Letters*, accepted DOI: 10.1007/s11249-015-0577-3, (2015).
2. **C.-D. Yeo**, A. Palazotto, J. Song and R. Buentello, "The Evaluation of Thermomechanical Damage of a Slipper and Rail in a Rocket Sled System," *ASTM Journal of Testing and Evaluation* **44(4)**, (2016) DOI: 10.1520/JTE20140367 (published online 2015).
3. J. Lee, J. Maharjan, M. He, and **C.-D. Yeo**, "Effects of In-Situ Sliding Contact on Dynamic Adhesion Measurement in Colloidal Probe Technique," *International Journal of Adhesion and Adhesives* **60**, 109 – 116 (2015).
4. M. He, S. Lee, and **C.-D. Yeo**, "Investigating Atomic Structure of Thin Carbon Film under Mechanical Stress and Frictional Heat Generation," *Surface and Coatings Technology* **261**, 79-85 (2015).
5. S. Lee, M. He, and **C.-D. Yeo**, "Thermal Degradation and Burnishing Wear of Thin Carbon Film by Frictional Heat Generation," *ASME Trans. Journal of Tribology* **136(4)**, 041603 (2014) DOI: 10.1115/1.4027749.
6. S. Lee, D. Purani, A. Kim, and **C.-D. Yeo**, "(Invited) Thermomechanical Contact between Magnetic Recording Head and Disk Defect accounting for Heat Partition Factor," *IEEE Trans. Magn.*, 50(30), 3300307 (2014).
7. S. Lee, M. He, G. Abo, Y. Hong, and **C.-D. Yeo**, "The Effects of Contact Stress on Magnetic Properties of Ferromagnetic Film," *Journal of Applied Physics* **112**, 084901 (2012).
 - Featured in Tribology & Lubrication Technology (TLT) Magazine June 2013
<http://digital.ipcprintservices.com/publication/index.php?i=156749&m=&l=&p=3&pre=>

8. **C.-D. Yeo**, J.K. Lee, and A.A. Polycarpou, "Dynamic adhesive forces in rough contacting bodies including normal and sliding conditions," *Journal of Adhesion Science and Technology* **26**, 2709-2718 (2012).
9. S.A. Lee, S. Niazie, and **C.-D. Yeo**, "The Change in Surface Properties of Magnetic Recording Media under Pulsed Laser Application," *Tribology Letters* **47**, 57-65 (2012).
10. S.A. Lee and **C.-D. Yeo**, "Microwear Mechanism of Head Carbon Film during Head Disk Interface Sliding Contact," *Tribology International* **45**, 30-37 (2012).
11. I.-H. Sung, H. J. Kim, and **C.-D. Yeo**, "First Observation on the Feasibility of Scratch Formation by Pad-Particle Mixture in CMP Process," *Applied Surface Science* **258**, 8298–8306 (2012).
 - Featured in the ADINA News (Tech Review)
<http://www.adina.com/newsgH123.shtml>
12. I.-H. Sung, W.Y. Yang, H. Kwark and **C.-D. Yeo**, "Fluid-Structure Interaction Modeling and Simulation of CMP Process for Semiconductor Manufacturing", *Transactions of the Society of Information Storage Systems* **7(2)**, 60-64 (2011).
13. **C.-D. Yeo**, R.R. Katta, J.K. Lee and A. A. Polycarpou, "Effect of asperity interactions on rough surface elastic contact behavior: Hard film on soft substrate," *Tribology International*, Vol. 43, pp. 1438-1448 (2010).
14. **C.-D. Yeo**, R.R. Katta and A.A. Polycarpou, "Improved Elastic Contact Model Accounting for Asperity and Bulk Substrate Deformation," *Tribology Letters* **35**, 91-203 (2009).
15. **C.-D. Yeo**, S. -C. Lee, and A.A. Polycarpou, "Dynamic adhesive force measurements under vertical and horizontal motions of interacting rough surfaces", *Review of Scientific Instruments* **79**, 015111 (2008).
16. **C.-D. Yeo**, A.A. Polycarpou, S.C. Lee and M. Sullivan, "Friction Force Measurements and Modeling in Hard Disk Drives," *IEEE Trans. Mag.* **44**, 157-162 (2008).
17. **C.-D. Yeo**, A.A. Polycarpou, J.D. Kiely and Y.-T. Hsia, "Nanomechanical Properties of Ultra-thin Carbon Film Overcoats Using the Nanoindentation Technique", *Journal of Materials Research* **22**, 141-151 (2007).
18. **C.-D. Yeo**, A.A. Polycarpou, "A Correction to the Nanoindentation Technique for Ultra-shallow Indentation Depths", *Journal of Materials Research* **22**, 2359-2362 (2007).
19. K.M. Lee, **C.-D. Yeo** and A.A. Polycarpou, "Relationship between scratch hardness and yield strength of elastic perfectly plastic materials using finite element analysis," *Journal of Materials Research* **23**, 2229-2237 (2008).
20. E. E. Nunes, **C.-D. Yeo**, R. Katta and A. A. Polycarpou, "Computational Analysis of the Effects of Planarization in Pattern Media," *IEEE Trans. Mag.* **44**, 3667-3670 (2008).
21. K.M. Lee, **C.-D. Yeo** and A.A. Polycarpou, "Nanomechanical Property and Nanowear Measurements for Sub-10 nm Thick Films in Magnetic Storage," *Experimental Mechanics* **47**, 107-121 (2007).
22. K.M. Lee, **C.-D. Yeo** and A.A. Polycarpou, "Mechanical Property Measurements of Thin Film Carbon Overcoat on Recording Media towards 1 Tb/in²," *Journal of Applied Physics* **99**, 08G906 (2006).

B. REVISION & SUBMITTED

1. J. Song and **C.-D. Yeo**, "Finite Element Analysis Simulations of Thermomechanical Head-Disk Interface Contact in Thermal Flying-Height Control Head Slider Design," *STLE Tribology Transaction*, under review.
2. M. He and **C.-D. Yeo**, "Speed Dependent Friction and Wear of Carbon Film with Molecularly Thin PFPE Lubricant," *Wear*, submitted.
3. J. Park, Y.-K. Hong, S.-G. Kim, **C.-D. Yeo**, L. Gao, and J.-U. Thiele, "Electronic Structures of Mn-substituted Fe-Pt," *Physical Review B*, submitted.

4. J. Song, J. Kim, H. Chang, J. Kim, and **C.-D. Yeo**, “Haptic Information and Sportswear Consumption: The Role of Autotelic and Instrumental Need for Touch,” *International Journal of Consumer Studies*, under review.

PATENTS

- **C.-D. Yeo**, J.Y. Kim, “Method of screening hard disk drive,” US Patent 7,123,428 (2006).
- J.Y. Kim, **C.-D. Yeo**, S.H. Song, G. Kim, “Methods of optimizing recording current and setting recording density of hard disk drive,” US Patent 7,102,838 (2006).
- J.Y. Kim, **C.-D. Yeo**, “Methods of measuring TPTP of magnetic head and controlling recording current,” US Patent 6,999,256 (2006).
- **C.-D. Yeo**, “Single head disk drive having backup system information and method of recording and/or reading system information thereof,” US Patent 7,167,961 (2007).
- J.Y. Yun, J.J. Kim, C.W. Cho, **C.-D. Yeo**, “Method and apparatus detecting base line popping noise in a read head and stabilizing the magnetic domain of merged magnetoresistive read-write heads using DC write current and read bias current for an assembled disk drive,” US Patent 6,828,784 (2004).
- **C.-D. Yeo**, J.Y. Kim, C. Park, “Method and apparatus for measuring magnetic write width of magnetic head using burst pattern,” EP Patent 1,383,114 (2006).
- **C.-D. Yeo**, J.Y. Kim, C. Park, “Method and apparatus for measuring magnetic write width of magnetic head using burst pattern,” US Patent 6,992,849 (2006).

TEACHING INTERESTS

- Material Behavior, Statics, Solid Mechanics, Elasticity, Computational Mechanics, Contact Mechanics, Tribology, Engineering Statistics

TEACHING EXPERIENCE

- Courses taught at Texas Tech University
 - ME 3403 Mechanics of Solids
 - ME 5340 Elasticity
 - ME 5345 Computational Mechanics
 - ME 5343 Contact Mechanics of Engineering Materials (Newly developed in TTU)

STUDENT ADVISING (Research Group Member)

- Current Graduate Students
 - Four Doctoral Students
 - One Master Student
 - One Undergraduate Student
- Alumni
 - Sungae Lee, PhD 2014, Senior Engineer at Seagate Technology, MN.
 - Onay Mert, MS 2012, Engineer, Flextronics, TX.
 - Shahrukh Niazie, MS 2012, Engineer, Fusion Solutions Inc., TX.

INVITED TALKS

- Seagate Conclave, CA, Aug. 2014 & 2015
- Army Research Laboratory, MD, Jan. 2014
- Mechanical Engineering Seminar Series, Texas A&M University, Oct. 2013
- IEEE The 24th Magnetic Recording Conference, Japan, Aug. 2013
- Seagate Research Center in Korea, Aug. 2013
- Air Force Institute of Technology, OH, Jan. 2013
- Interdisciplinary Lecture Series, College of Engineering, Texas Tech University, Nov. 2012
- Mechanical Engineering seminar, Texas Tech University, Oct. 2012
- Seagate Technology RMO, CA, Oct. 2012
- Seagate Technology TCO, MN, Dec. 2011
- Western Digital Corporation, CA, Oct. 2010
- Mechanical Engineering seminar series, Yonsei University, Jul. 2010
- Mechanical Engineering seminar series, SungKyunKwan University, Jun. 2010
- Intel Corporation, AZ, Jan. 2008
- Qualcomm MEMS Technologies, CA, Sep. 2007
- Xerox Research, NY, Dec. 2007

COMMUNITY SERVICE

- Technical Mentor, the Destination Imagination team in Preston Smith Elementary School, 2010

ACADEMIC SERVICE

- Served as a peer reviewer of: 2007 ~ Present
 - ✓ Proceedings of the National Academy of Sciences (PNAS)
 - ✓ Review of Scientific Instruments
 - ✓ IEEE, Transaction of Magnetics
 - ✓ Solar Energy
 - ✓ Composite Science and Technology
 - ✓ Transaction of ASME, Journal of Tribology
 - ✓ Tribology International
 - ✓ Tribology Letters
 - ✓ STLE Tribology Transactions
 - ✓ Journal of Aerospace Engineering
 - ✓ Journal of Adhesion Science and Technology
 - ✓ Journal of Mechanical Science and Technology
- ASME contact mechanics committee: 2009 ~ Present
- International Joint Tribology Conference 2010: Session co-chair, Magnetic Storage Division
- International Joint Tribology Conference 2011: Session chair, Magnetic Storage Division
- Editorial Member: Korean Society of Tribology and Lubrication Engineers, 2011 ~ present
- Associate Editor: Korean Society of Tribology and Lubrication Engineers, 2014 ~ present

TECHNICAL CONSULTANT

- Western Digital Corporation: 2010 ~ 2011
 - Thin film reliability
 - Mechanical stress and deformation of head slider due to localized air pressure