Siddhesh V. Sakhalkar

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Research Interests

Scientific Machine Learning, Structural Mechanics and Dynamics (with a focus on Design Optimization, Uncertainty Quantification, System Identification), Fluid Mechanics (with a focus on micro/nanoscale flows), Tribology

Experience

Assistant Professor, Department of Mechanical Engineering — *Mar 2026 – present*
Indian Institute of Technology Madras (IIT Madras), Chennai, India

Principal Engineer, Simulation & Analysis — *Oct 2023 – Oct 2025*
Western Digital, San Jose, CA, USA

Staff Engineer, Simulation & Analysis — *Aug 2020 – Oct 2023*
Western Digital, San Jose, CA, USA

Mechanical Static Engineer, Mechanical, Materials & Integrity — *Aug 2014 – May 2016*
Shell India Markets Pvt. Ltd., Bengaluru, India

Education

University of California, Berkeley (UC Berkeley) — *2016 – 2020*
M.S. & Ph.D. in Mechanical Engineering — *GPA: 4.0/4.0*

- **Major:** Continuum Mechanics, **Minor:** Mathematics & Heat Transfer
- **Thesis:** Nanoscale Lubricant Flow and Heat Transfer at the Head-Disk Interface in Hard Disk Drives
- **Advisor:** David B. Bogy

Indian Institute of Technology Bombay (IIT Bombay) — *2010 – 2014*
B.Tech. in Mechanical Engineering — *GPA: 9.36/10.0*

- **Minor:** Engineering Physics

Journal Publications

9. **S. V. Sakhalkar**, B. Kaplan, R. Koosha, H. Shindo (2024)
   Predicting device-to-device frequency response function variation during high-volume manufacturing of a hardware device
   Mechanical Systems and Signal Processing
8. Q. Cheng, **S. V. Sakhalkar**, D. B. Bogy (2022)
   Direct measurement of disk-to-head back-heating in HAMR using a non-flying test stage
   Applied Physics Letters
7. Q. Cheng, H. Wang, **S. V. Sakhalkar**, D. B. Bogy (2020)
   Measurement of angstrom-level laser induced protrusion using touchdown in heat-assisted magnetic recording
   Applied Physics Letters
   Covered as a Scilight report (Science Highlight that showcases the most interesting research across the physical sciences published in AIP Publishing Journals)
6. **S. V. Sakhalkar**, Q. Cheng, A. Ghafari, D. B. Bogy (2020)
   Investigation of heat transfer across a nanoscale air gap between a flying head and a rotating disk
   Journal of Applied Physics
5. Q. Cheng, **S. V. Sakhalkar**, A. Ghafari, Y. Ma, D. B. Bogy (2020)
   Dependence of nanoscale heat transfer across a closing gap on the substrate material and ambient humidity
   Applied Physics Letters

4. **S. V. Sakhalkar**, Q. Cheng, A. Ghafari, Y. Ma, D. B. Bogy (2019)
   Numerical and experimental investigation of heat transfer across a nanoscale gap between a magnetic recording head and various media
   Applied Physics Letters
3. **S. V. Sakhalkar**, D. B. Bogy (2019)
   Viscoelastic Lubricant Deformation and Disk-to-Head Transfer During Heat-Assisted Magnetic Recording
   IEEE Transactions on Magnetics
2. **S. V. Sakhalkar**, D. B. Bogy (2018)
   Effect of Rheology and Slip on Lubricant Deformation and Disk-to-Head Transfer During Heat-Assisted Magnetic Recording (HAMR)
   Tribology Letters
1. **S. V. Sakhalkar**, D. B. Bogy (2017)
   A Model for Lubricant Transfer from Media to Head During Heat-Assisted Magnetic Recording (HAMR) Writing
   Tribology Letters

Patents

5. J.-S. Park, T. J. Hitchner, R. McNab, **S. V. Sakhalkar** (2025)
   Center structure having attachment support for an actuator in a multi-actuator hard disk drive
   US Patent 12230303B2
4. J.-S. Park, **S. V. Sakhalkar**, A. V. Golgolab, F. Golinveaux (2024)
   Extended center stiffener plate for improved structural dynamics of actuators in a multi-actuator hard disk drive
   US Patent 12176013B2
3. J.-S. Park, **S. V. Sakhalkar**, T. J. Hitchner A. V. Golgolab (2024)
   Anchoring structure for improved structural dynamics of actuators in a multi-actuator hard disk drive
   US Patent 11942121B2
2. M. Keshavan, **S. V. Sakhalkar**, H. Shindo (2023)
   Management of actuator dynamics in a multiple actuator hard disk drive with an unequal number of heads on the two outer arms of each actuator
   US Patent 11664047B2
1. M. Keshavan, Y. Liu, H. Shindo, **S. V. Sakhalkar** (2022)
   Data storage device independently driving outer and inner fine actuators
   US Patent 11482254B2, China Patent 114944170B

Conference Proceedings and Technical Publications

5. **S. V. Sakhalkar**, Q. Cheng, D. B. Bogy (2020)
   Numerical and Experimental Investigation of Nanoscale Heat Transfer Between a Flying Head Over a Rotating Disk
   Proceedings of the ASME 2020 29th Conference on Information Storage and Processing Systems
4. Q. Cheng, H. Wang, **S. V. Sakhalkar**, D. B. Bogy (2020)
   Experimental Study on Laser-Induced Protrusion in Heat-Assisted Magnetic Recording
   Proceedings of the ASME 2020 29th Conference on Information Storage and Processing Systems
3. **S. V. Sakhalkar**, Q. Cheng, Y. Ma, A. Ghafari, D. B. Bogy (2019)
   Numerical and Experimental Investigation of Nanoscale Heat Transfer in the Head-Media Interface During Static Touchdown
   Proceedings of the ASME 2019 28th Conference on Information Storage and Processing Systems
2. **S. V. Sakhalkar**, P. Dhillon, P. Kumar, S. Bakshi, P. S. Arora (2014)
   Implementation of an Electronic Differential Using Torque Vectoring
   SAE Technical Paper
1. **S. V. Sakhalkar**, P. Dhillon, S. Bakshi, P. Kumar, P. S. Arora (2014)
   Powertrain Model for Selection of Reduction Ratio and Estimation of Energy Requirement
   SAE Technical Paper

Honors and Awards

- Three-time recipient of Western Digital **Exceptional Impact Award** (2021, 2023, 2024)
- International Data Technology Conference 2023 (Western Digital Conference) **Best Paper Award** (2023)
- ASME 29th Conference on Information Storage and Processing Systems conference fee waivership award (2020)
- **John and Janet McMurtry Fellowship**: awarded to the **top Ph.D. student** in the entire UC Berkeley Mechanical Engineering Department each year (2019)
- ASME 28th Conference on Information Storage and Processing Systems **Best Paper Award** (2019)
- IEEE Student Travel Grant to attend the 2019 Joint MMM-Intermag Conference (2019)
- **The Otto and Herta F. Kornei Endowment Fund Fellowship** (2018)
- Graduate Division Block Grant Award by UC Berkeley Mechanical Engineering (2018)
- Offered the **Presidential Fellowship** to join graduate school at Brown University. This is the most prestigious doctoral fellowship awarded to some of the most outstanding applicants across all disciplines (2016)

Talks

- **Advancing the Mechanical Design, Development and Reliability of Next-Generation Hard Disk Drives**
  Department of Mechanical Engineering, IIT Madras, Jan 20, 2025
- **Predicting Drive-to-Drive Frequency Response Function Variation**
  ASME 32nd Conference on Information Storage and Processing Systems, Aug 28-29, 2023, Milpitas, CA, USA
- **Predicting HDD Boundary Resonance using Simulation and Statistics**
  International Data Technology Conference (Western Digital Conference), Jan 18, 2023, Milpitas, CA, USA
- **Numerical and Experimental Investigation of Nanoscale Heat Transfer Between a Flying Head Over a Rotating Disk**
  ASME 29th Conference on Information Storage and Processing Systems, Jun 24–25, 2020, Virtual Conference
- **Experimental and Numerical Investigations of Head-Disk Interface in HAMR**
  Jointly presented with Q. Cheng
  Advanced Storage Research Consortium Research Review Meeting, Apr 13, 2020, Virtual Meeting
- **Thermal Effects in HAMR & MAMR Heads**
  Jointly presented with Q. Cheng
  Advanced Storage Research Consortium Research Review Meeting, Oct 24–25, 2019, Milpitas, CA, USA
- **Numerical and Experimental Investigation of Nanoscale Heat Transfer in the Head-Media Interface During Static Touchdown**
  ASME 28th Conference on Information Storage and Processing Systems, Jun 27–28, 2019, San Diego, CA, USA
- **Experimental Investigation of Laser Heating in HAMR HDI**
  Jointly presented with Q. Cheng
  Advanced Storage Research Consortium Research Review Meeting, Mar 14–15, 2019, Fremont, CA, USA
- **Viscoelastic Lubricant Deformation and Disk-to-Head Transfer During Heat-Assisted Magnetic Recording**
  2019 Joint MMM-Intermag Conference (IEEE), Jan 14–18, 2019, Washington DC, USA

Leadership and Service

Associate Editor *Mar 2023 – present*
SAE International Journal of Materials and Manufacturing

Program Chair *Aug 2022 – Aug 2023*
ASME 32nd Conference on Information Storage and Processing Systems, Aug 28-29, 2023, Milpitas, CA, USA

Publicity Co-Chair *Aug 2020 – Aug 2021*
The 32nd Magnetic Recording Conference (TMRC 2021), Aug 16-19, 2021, Virtual Conference

Local Administrator *Aug 2019 – Aug 2020*
The 31st Magnetic Recording Conference (TMRC 2020), Aug 17-20, 2020, Virtual Conference

Lab Administrator *2017 – 2020*
Computer Mechanics Laboratory, UC Berkeley

Peer Reviewer *2018 – present*
Microsystem Technologies, IEEE Transactions on Magnetics – Conferences, ASME 2021 30th Conference on Information Storage and Processing Systems, Journal of Engineering and Applied Science, SAE International Journal of Commercial Vehicles, SAE International Journal of Materials and Manufacturing, SAE International Journal of Passenger Cars: Mechanical Systems, SAE Technical Papers, SAE International Journal of Vehicle Dynamics, Stability, and NVH, SAE International Journal of Electrified Vehicles, SAE International Journal of Sustainable Transportation, Energy, Environment, & Policy, SAE International Journal of Aerospace

Team Leader *Jul 2013 – Jul 2014*
IIT Bombay Racing Team: Led a 70-member multi-disciplinary student team on design, fabrication, assembly and testing of an electric race car vehicle for the 2014 Formula Student competition in Silverstone, UK

Teaching

Video Lecture Series *2024*
Created an online, 5-part, video lecture series on "Introduction to the Finite Element Method" in 1D: link

Undergraduate Teaching Assistant *Jan 2012 - May 2012*
Modern Physics, IIT Bombay