ME
EE
Physics

Precision Engineering Research Group
Yılmaz Laboratory

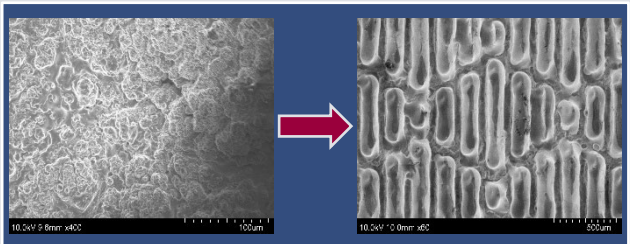
Research Themes: **Tribology & Surface Engineering**

- friction, wear, lubrication in mechanical systems
- aim for higher efficiency, smooth operation and longevity
- increased heat flux for cooling systems

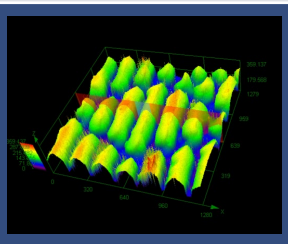
yilmaz-emir.github.io

In our laboratory, we conduct research in the field of **precision engineering**, focusing on *friction*, *heat*, *fluids*, and *materials*, broadly known as **tribology**. By combining simulations and experiments, we **create functional surfaces** using methods such as *electrical discharge machining* (EDM), *laser surface texturing* (LST), and *functional coatings*.

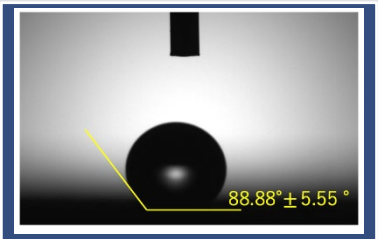
Students can work on research related to manufacturing technologies while improving *energy efficiency*, *enhancing wear resistance*, and *controlling surface wettability* for future surface technologies.



SEM images before & after LST



3D surface analysis



Surface wettability measurement

Example: Fabrication of self-cleaning surfaces with anti-sticking properties

Fabrication of micro-textures by LST and measurement of surface roughness and wettability

Related courses:

- Design Engineering
- Machining Processes
- Thermal – fluid engineering
- Material science
- Data science
- Programming (python, Fortran, C++)

Collaborators:

Isuzu Advanced Engineering Center, Kanto Gakuin University,
Automotive ICE Technology Research Association (AICE),
Indian Institute of Technology Delhi (IIT Delhi)
@ Sophia: Tanaka Laboratory (PEL), Suzuki - Ichiyanagi Laboratory (TEL)

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Join us in designing the functional surfaces of the future!