Tribocorrosion Study of AM Ti6Al4V with Surface structure and UHMWPE Interfaces Under Synovial Fluid Degradation: Insights from a Scientific Mobility at EPFL

Lukáš Odehnal

Biotribology Research Group
Institute of Machine and Industrial Design
Faculty of Mechanical Engineering
Brno University of Technology

Brno, 9th September 2025

INSTITUTE OF **MACHINE**
AND **INDUSTRIAL DESIGN**

Lausanne

- Capital of the canton of Vaud
- Located on the shores of Lake Geneva
- About 150,000 inhabitants
- Over 400,000 in the metropolitan area
- The official language is French

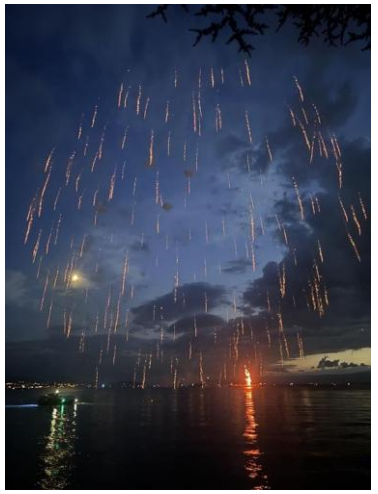
Lausanne

- Lausanne Ouchy
- Originally a fishing village
- Beautiful promenade
- The most popular recreational area

Lausanne

- Lausanne Ouchy
- Originally a fishing village
- Beautiful promenade
- The most popular recreational area

- Fireworks at Lausanne Ouchy
- August 1st – Swiss National Day
- Founding of the Swiss Confederation



Lausanne

- Headquarters of the International Olympic Comittee (IOC)
- Officially recognised as Olympic Capital of the World
- Olympic Museum

EPFL

- École Polytechnique Fédérale de Lausanne
- Founded in 1853 – Federal institute in 1969
- Around 12,000 students and 4,000 researchers
  - From 120 nationalities
- Over 350 research laboratories

- Fields of excellence: robotics, nanotechnology, bioengineering, computer science …

- Strong collaboration with industry
  - More than 300 startups

Background and Motivation

TIC – Tribology and Interfacial Chemistry
École Polytechnique fédérale de Lausanne (EPFL), Switzerland

Dr. Stefano Mischler (H-index 48)
Dr. Anna Neus Igual Muñoz (H-index 30)

The group is active in the field of advanced tribology as a multi-disciplinary, multi-scale discipline at the interface between material science, mechanics and surface chemistry and physics.

Materials and Methods

Materials and Methods

Results – Lubricant behaviour

Results - Friction

Results – Depassivation charge

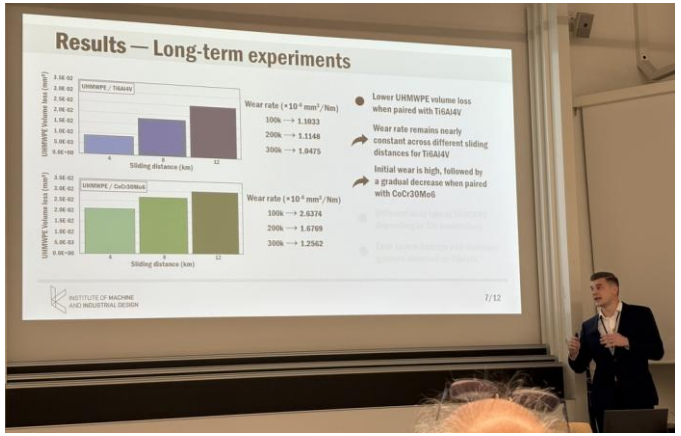
Results – Surface topography

Results – Surface topography

Conclusions

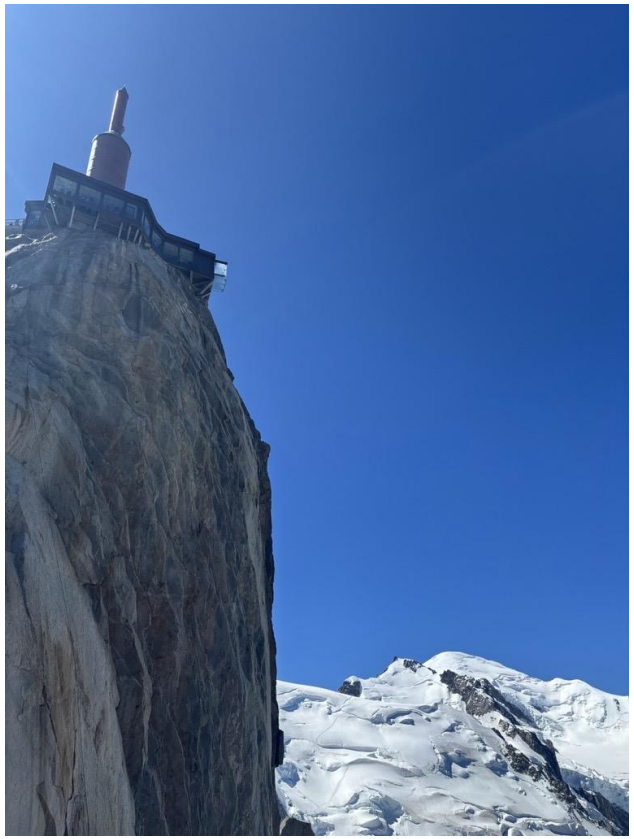
Conclusions

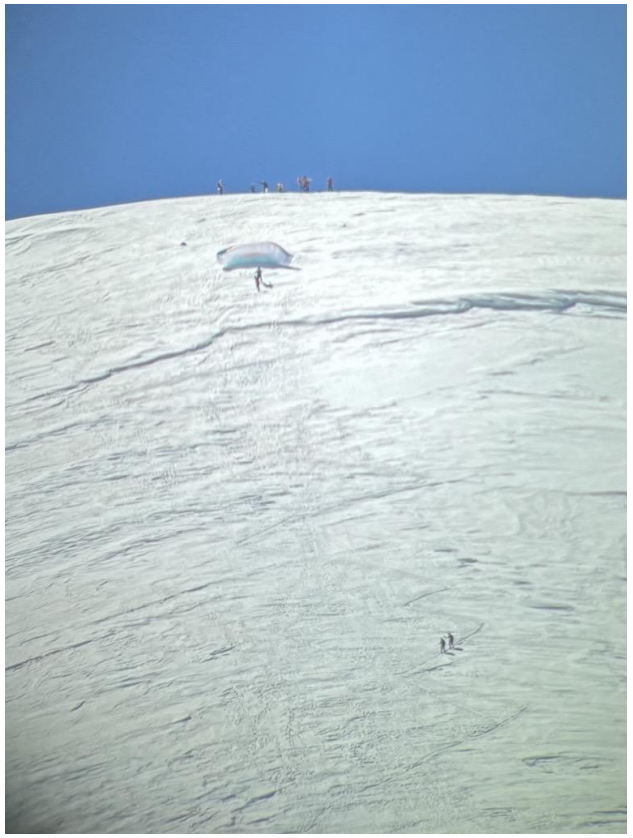
ECOTRIB 25 - Zurich



Visual break

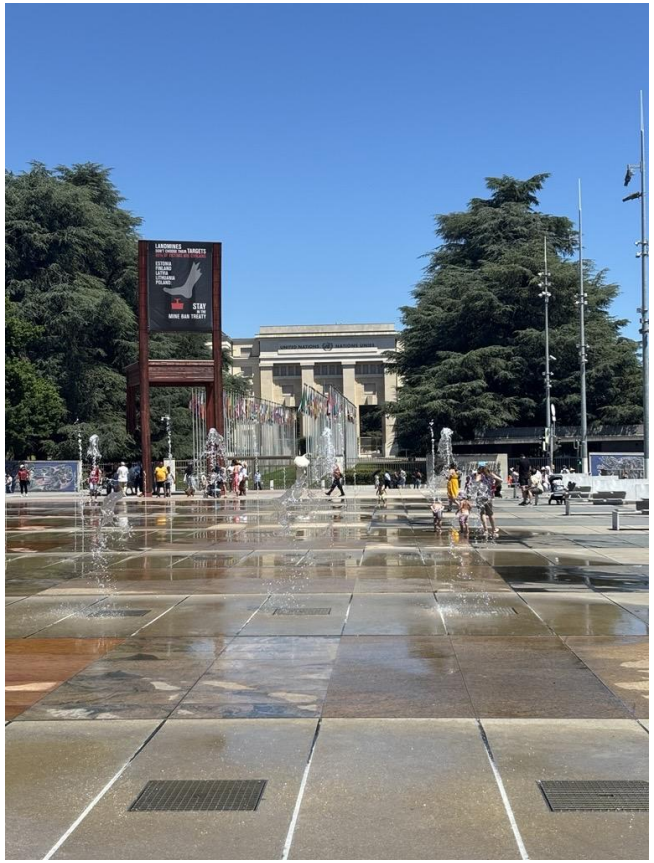
- **Mont Blanc – Aiguille du midi**





Visual break

- Geneva



THANK YOU FOR YOUR ATTENTION!

Lukáš Odehnal

Lukas.Odehnal@vut.cz

Supported by the project "Mechanical Engineering of Biological and Bio-inspired Systems",
funded as project No. CZ.02.01.01/00/22_008/0004634 by Programme Johannes Amos Commenius, call Excellent Research.

Co-funded by the European Union

MINISTRY OF EDUCATION, YOUTH AND SPORTS

MEBioSys
Excellent Research