

# INTRODUCTION OF THE FIRST YEAR PHD STUDENT

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ÚSTAV KONSTRUOVÁNÍ  
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VUT v Brně

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ÚSTAV  
KONSTRUOVÁNÍ

# CONTENT

- Introduction of myself
- Education
- Bachelor thesis
- Master thesis
- Doctoral study
- Teaching activities



# INTRODUCTION

**Place of birth:** Krompachy

**Permanent residence:** Olcnava

**Inhabitants:** 1084

**Region:** Košice

**District:** Spišská Nová Ves



<https://bit.ly/2nIO4bR>



# INTRODUCTION

Spišská Nová Ves



**Štefánikovo námestie**

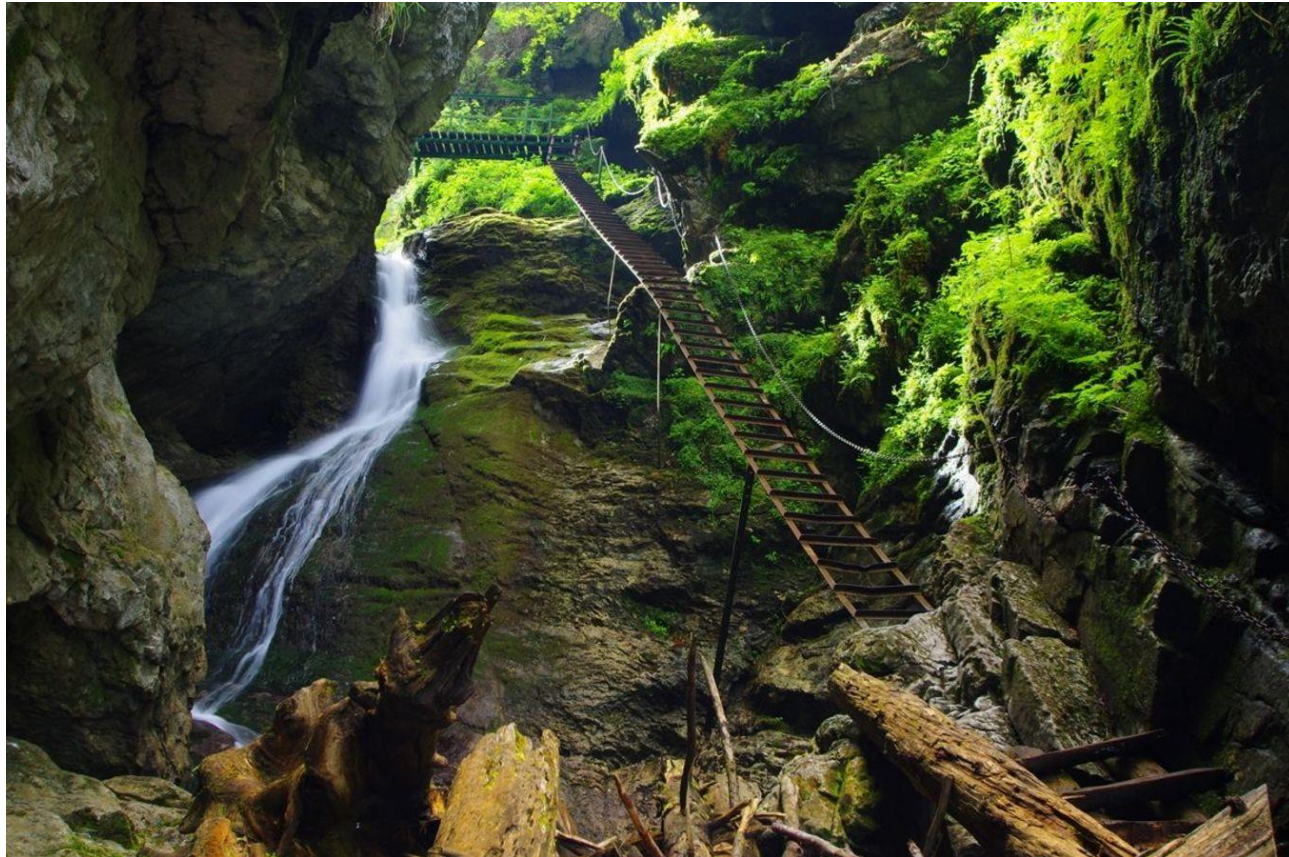
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**Ríms. kat. kostol SNV**

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# INTRODUCTION



**Slovenský raj NP**

<https://bit.ly/2nzXdDI>



**Spišský hrad**

<https://bit.ly/2ESDQdx>

# HOBBIES



Skiing



Hiking

# HOBBIES



Hiking

# EDUCATION

## High school

- Gymnázium školská 7, Spišská Nová Ves (2010 - 2014)

## University

- Bachelor degree – BUT, Fundamentals of Mechanical Engineering (2014 - 2017)
- Masters degree – BUT, Mechanical Engineering Design (2017 -2019)



Gymnázium Školská 7



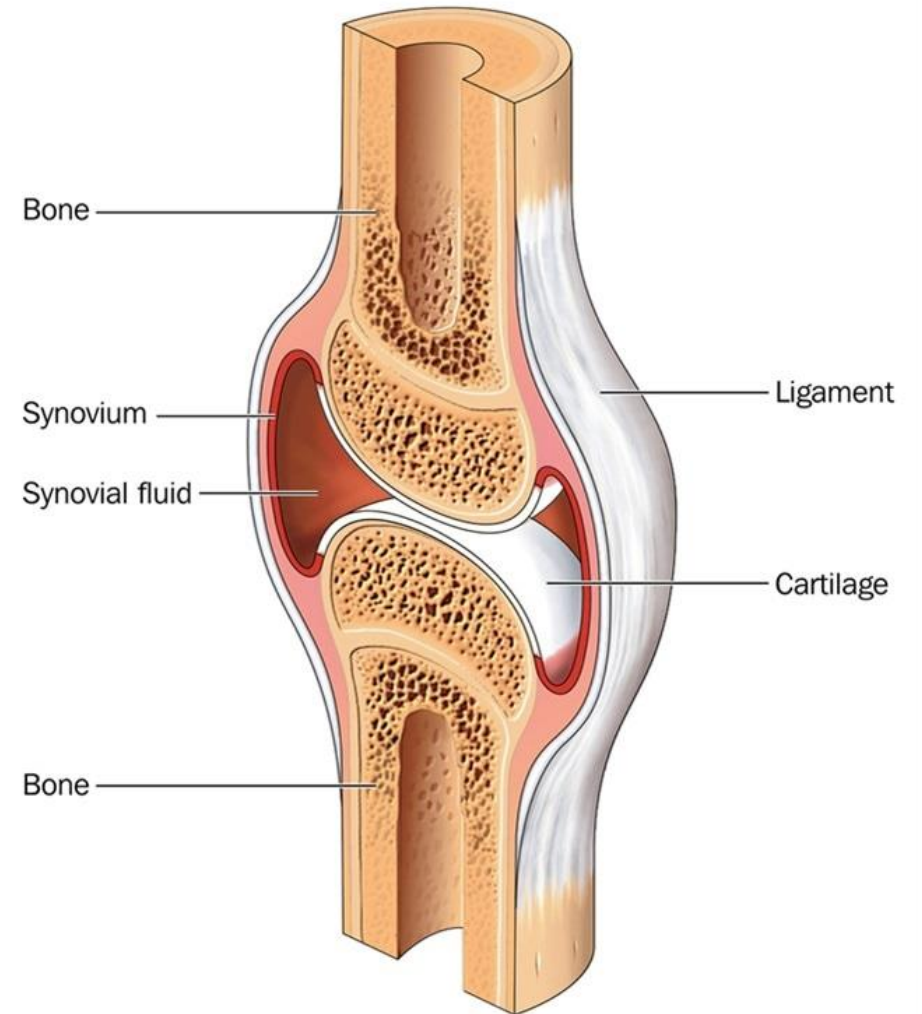
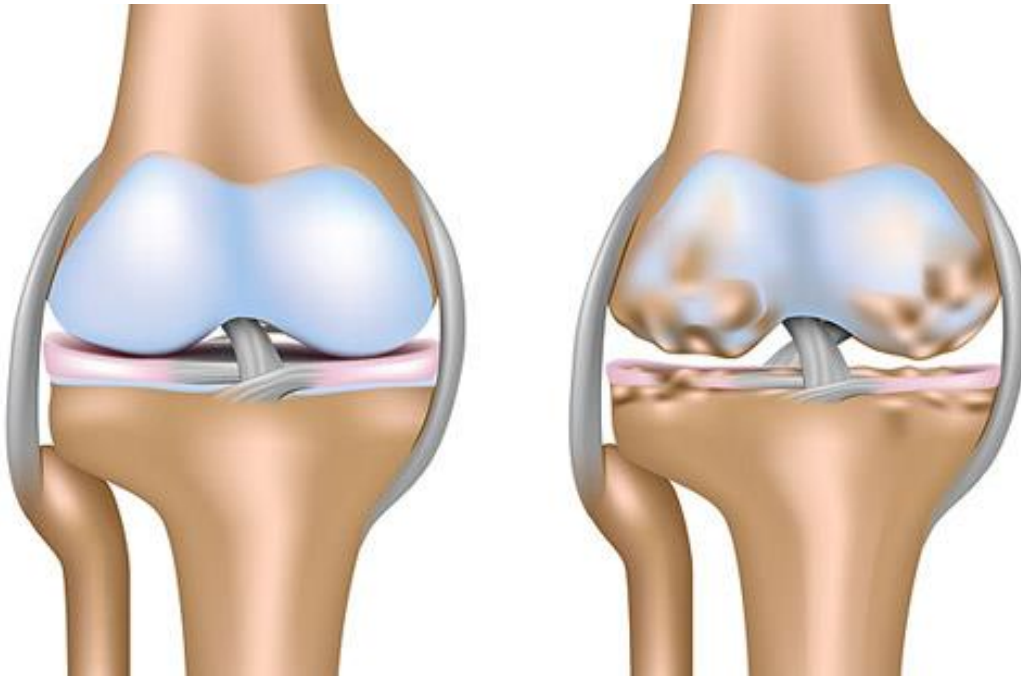
BUT, Faculty of Mechanical Engineering



# BACHELOR THESIS

## Biotribology of articular cartilage

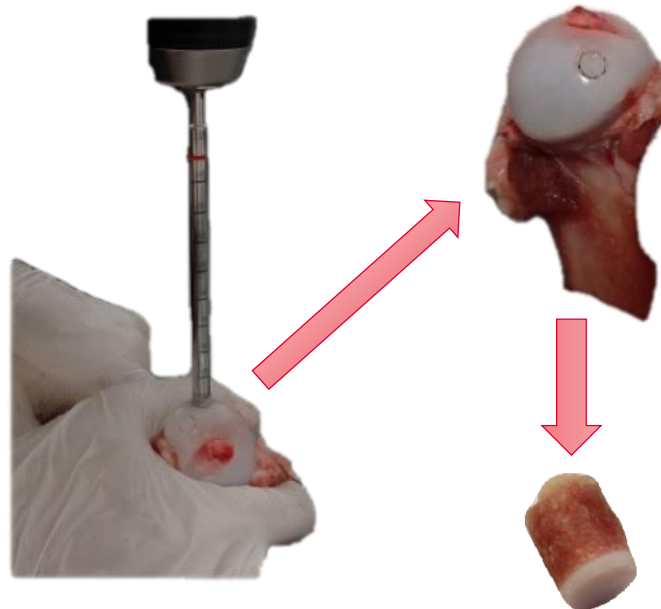
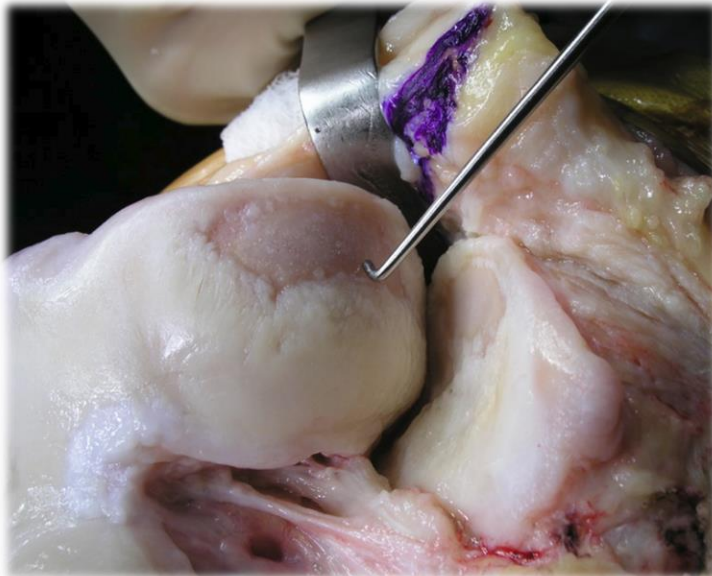
- Institute of Machine and Industrial Design
- Supervisor: Ing. David Nečas Ph.D.



# DIPLOMA THESIS

## The effect of synovial fluid composition on friction of joint cartilage

- Institute of Machine and Industrial Design
- Supervisor: Ing. David Nečas Ph.D.

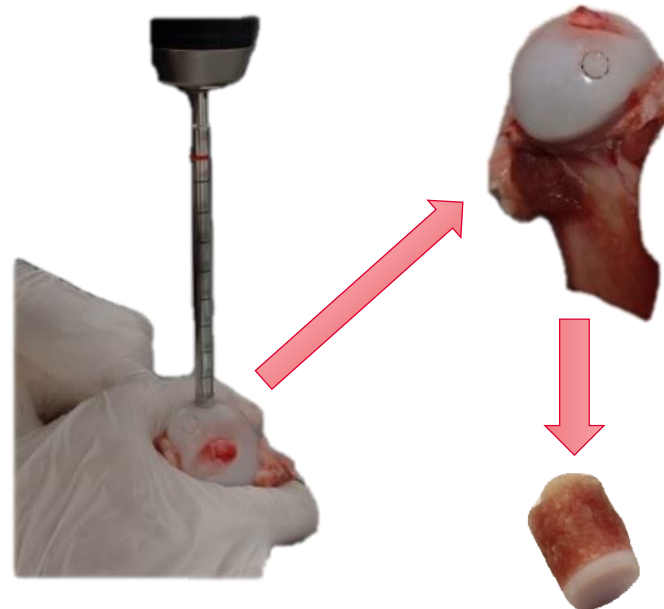
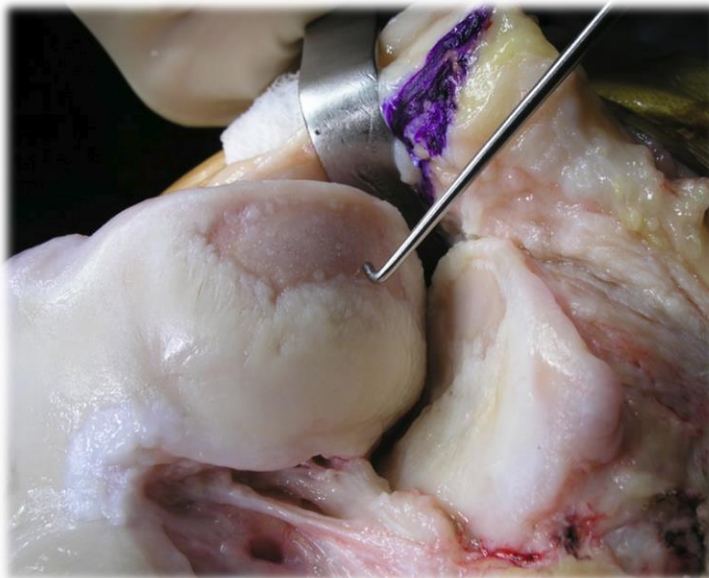


Bruker - UMT Tribolab  
(<https://goo.gl/rFT6KT>)

# DIPLOMA THESIS

## The effect of synovial fluid composition on friction of joint cartilage

- Institute of Machine and Industrial Design
- Supervisor: Ing. David Nečas Ph.D.



The effect of synovial fluid constituents on frictional behaviour of joint cartilage  
Furmann D.,<sup>a,\*</sup> Nečas D.,<sup>a</sup> Rebenda D.,<sup>a</sup> Čipek P.,<sup>a</sup> Galandáková A.,<sup>b</sup> Krúpka I.,<sup>a</sup> Hartl M.<sup>a</sup>

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<sup>b</sup>Faculty of Medicine and Dentistry, Palacky University Olomouc, Czech Republic

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### Abstract

This study deals with the analysis of the effect of the constituents of the model synovial fluid on the frictional properties of articular cartilage. The influence of constituents, concentration, speed and load is observed. Experiments were performed on a commercial tribometer at configuration pin-on-plate. Several types of lubricants containing synovial fluid constituents have been selected for the experiments. Lubricants were prepared at two concentrations, the concentration of healthy individuals and at a concentration typical of for osteoarthritic patients. Speeds 5 and 10 mm/s and 5 and 10 N loads were used for all experiments. It is shown that when using only lubricant containing proteins, no difference in the coefficient of friction is observed and the effect of concentration is also not observed. The addition of hyaluronic acid has a synergistic effect with  $\gamma$ -globulin, however in the case of lubricants containing albumin, the effect is opposite. After the addition of phospholipids, no significant effect on friction is observed in  $\gamma$ -globulin containing lubricants. No significant effect of the composition and concentration of the lubricants is observed with the load change.

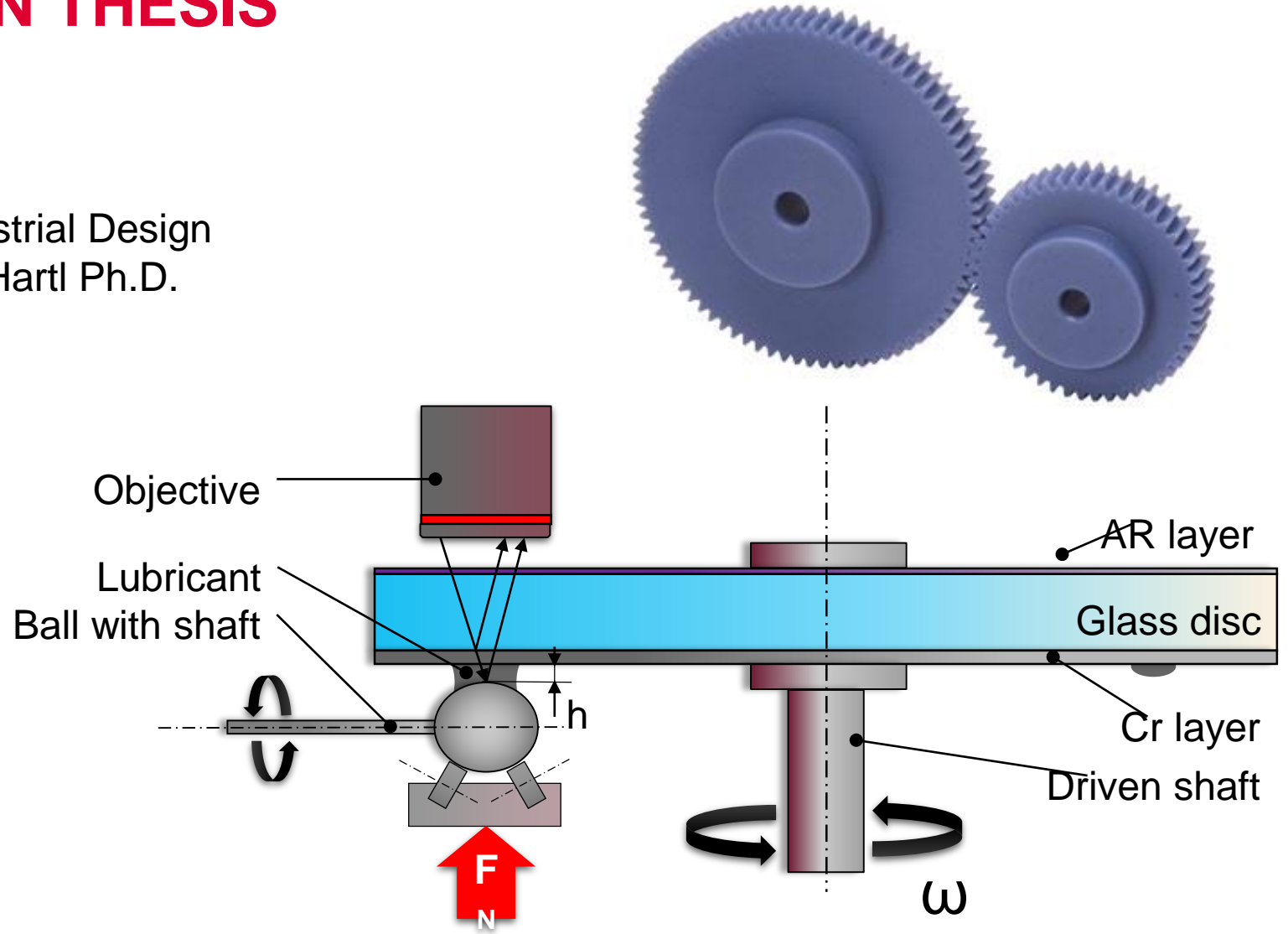
### Keywords

Biotribology, articular cartilage, coefficient of friction, tribological properties, synovial fluid

# DISSERTATION THESIS

## Tribology of soft bodies

- Institute of Machine and Industrial Design
- Supervisor: prof. Ing. Matrin Hartl Ph.D.



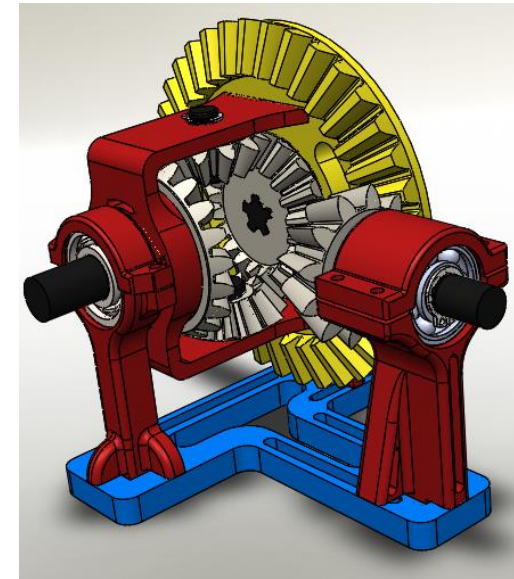
# EDUCATION ACTIVITIES

## Teaching:

- 6KM Machine Design – Mechanisms, 3D print and Solidworks
- 3CD CAD
- ZSY-A FEM – ANSYS Classic

## Learning:

- 9MOP Methodologies of Scientific Work
- 9EXT Experimental methods in Tribology
- 9AJ English for Doctoral Degree Study
- 9EHD Elastohydrodynamics
- 9VPR Research Project and Its Management



# THANK YOU FOR YOUR ATTENTION

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