Dr. habil. Gusztáv FEKETE

Senior Research Fellow

Department of Material Science and Technology
AUDI Hungária Faculty of Automotive Engineering
SZÉCHENYI ISTVÁN UNIVERSITY
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ACADEMIC EDUCATION

2019/03 **Habilitation in Computer Science**

Title of dissertation: *New bioinformatics models and methods for assessing pathological problems of the lower limb joint.*

Széchenyi István University, Doctoral School of Multidisciplinary Engineering Sciences,

Győr, Hungary.

2013/10 **PhD in Engineering Science: Agro-mechanical Engineering**

Title of dissertation: *Kinetics and kinematics of the human knee joint under standard and non-standard squat movement*

Szent István University, Doctoral School of Mechanical Engineering,

Gödöllő, Hungary

2013/05 **PhD in Engineering Science: Electro-mechanical Engineering**

Title of dissertation: *Kinetics and kinematics of the human knee joint under standard and non-standard squat movement*

Ghent University, Faculty of Engineering and Architecture,

Gent, Belgium

2007/06 **MSc in Mechanical Engineering: Specialization in Product and Technology Development**

Title of master thesis: *Reconstructional design of a knee test rig*

Szent István University (currently, Hungarian University of Agriculture and Life Sciences), Faculty of Mechanical Engineering (currently, Institute of Technology).

Gödöllő, Hungary

ACADEMIC POSITIONS

2023 – **Senior Research Fellow**
Department of Material Science and Technology
AUDI Hungária Faculty of Automotive Engineering, Széchenyi István University

2016 – **Visiting Professor, researchers**
Research Academy of Grand Health
Faculty of Sport Science, Ningbo University

2017 – 2024 **Associate Professor**
Savaria Institute of Technology
Faculty of Informatics, Eötvös Loránd University

2014 – 2016 **Associate Professor, Head of department**
Department of Mechanical Engineering
Faculty of Natural and Technical Sciences, University of West Hungary

2010 – 2013 **Ph.D scholar, researcher**
Department of Mechanical Construction and Production (Soete Laboratory)
Faculty of Engineering and Architecture, Ghent University

2007 – 2010 **Ph.D scholar, researcher**
Department of Mechanics and Engineering Design
Faculty of Mechanical Engineering, Szent István University

MEMBERSHIP IN DOCTORAL SCHOOLS

2024 – **Academic member**, **PhD supervisor**
Doctoral School of Multidisciplinary Engineering Sciences, Széchenyi István University

2021 – **Academic member**, **PhD supervisor**
Doctoral School on Safety and Security Sciences, Óbuda University

2018 – **Academic member**
Doctoral School of Informatics, Eötvös Loránd University, Hungary.

2016 – **Academic member, PhD supervisor, member of the doctoral and habilitation council**
Doctoral School of Chemical Engineering and Material Science, University of Pannonia

2015 – 2017 **Academic member, PhD supervisor**
Kitaibel Pál Doctoral School of Environmental Science, University of West Hungary

RESEARCH FIELDS

- **Application of Multibody dynamics in biomechanics**: Numerical analysis of wear on contact surfaces (lateral and medial) of the tibia plateau (MSC.ADAMS).
- **Reconstruction design/development of total knee replacements (TKRs):** The process of laser scanning an actual prosthesis, through the analysis of the raw-data, up to the creation of the import-ready geometrical model. The geometric TKR models can be directly imported into the MSC.ADAMS for simulation and virtual testing.
- **Development of polymer composites**: Development and experimental testing (SEM, AFM, Pin-on-Disc testing) of natural fiber reinforced composites from renewable sources (agriculture) for the development of brake lining materials.

EDUCATION ACTIVITIES

- Subject (BSc): Statics
- Subject (BSc): Mechanics of Materials
- Subject (BSc): Multibody dynamics

LANGUAGE SKILLS

- English: Full professional proficiency (C1)
- Dutch: Professional working proficiency (B2)
- German: Elementary proficiency (B1)
- Hungarian: Native (C2)

SCIENTIFIC ACTIVITIES AND MEMBERSHIPS

PhD supervisor activity: Graduated PhDs

1. Fenila CHRISTOPHER: *Targeting histamine H4 receptors in allergies caused by air pollutants*. Kitaibel Pál Doctoral School of Environmental Sciences (currently József Cziráki Doctoral School of Wood Sciences and Technologies), University of Sopron. Date of PhD defense: 2017.06.07. ID number of dissertation: 415
2. Sun DONG. *Gait analysis and muscoloskeletal modelling used in athletes recovery from Achilles tendon rupture*. Chemical Engineering and Material Sciences Doctoral School, University of Pannonia. Date of PhD defense: 2020.06.23. ID number of dissertation: 22/2020. DOI: 10.18136/PE.2020.742
3. Gongju LIU. *Performance enhancement of professional weightlifters and treatment of patella tendinopathy in competitive sports athletes.* Chemical Engineering and Material Sciences Doctoral School, University of Pannonia. Date of PhD defense: 2020.04.13. DOI: 10.18136/PE.2021.809
4. Wenjing QUAN. *Effect of footwear drop on running biomechanics and finite element analysis in recreational runners*. Chemical Engineering and Material Sciences Doctoral School, University of Pannonia. Date of PhD defense: 2023.12.12. DOI: 10.18136/PE.2023.862
5. Meizi WANG. *Morphological and biomechanical effects of high heels shoes on the lower limbs during gait*. Doctoral School on Safety and Security Sciences, Óbuda University. Date of PhD defense: 2023.03.09.
6. Fengqin FU. *Enhancement of runners' performance and protection by alternative longitudinal bending stiffness of the shoes*. Doctoral School on Safety and Security Sciences, Óbuda University. Date of PhD defense: 2023.03.17.

PhD supervisor activity: PhD candidates in progress:

1. Siqin SHEN. Proposed PhD title: *Comparative analysis of novice and athlete runners with regard to biomechanical Parameters*. Chemical Engineering and Material Sciences Doctoral School, University of Pannonia. Starting date of the PhD program: 2020 September. STIPENDIUM HUNGARICUM.
2. Zixiang GAO. Proposed PhD title: *The effect of fatigue on the symmetry of Biomechanical Variables of the lower limb joints*. Chemical Engineering and Material Sciences Doctoral School, University of Pannonia. Starting date of the PhD program: 2021 September. STIPENDIUM HUNGARICUM.
3. Yuqi HE. Proposed PhD title: *Lower limb kinetic comparisons between the chasse step and one step footwork during different sport activities*. Chemical Engineering and Material Sciences Doctoral School, University of Pannonia. Starting date of the PhD program: 2021 September. STIPENDIUM HUNGARICUM.
4. Xin LI: Proposed PhD title: *Effects of shoes and other ankle or foot appliances on balance in pregnant people*. Chemical Engineering and Material Sciences Doctoral School, University of Pannonia. Starting date of the PhD program: 2023 September.
5. Zhenghui LU: Proposed PhD title: *Effects of 3D printed shoes with different lattice structures on gait and plantar pressure*. Chemical Engineering and Material Sciences Doctoral School, University of Pannonia. Starting date of the PhD program: 2023 September.

PhD reviewer activity:

1. Talabérné Kulcsár Klaudia: *Fogászati implantátumok mechanikai vizsgálatainak új elméleti, informatikai, kísérleti módszerei és eredménye*. Széchenyi István University, Doctoral School of Multidisciplinary Engineering Sciences, Győr, 2024.
2. Szuchy Péter: *Veszélyes determinisztikus és sztochasztikus rezgések elhárítása*. Óbudai University, Doctoral School on Safety and Security Sciences, Budapest, 2022.
3. Kheireddine Zehouani: *Improvement of knee prosthesis geometry*. Hungarian University of Agriculture and Life Sciences, Mechanical Engineering PhD School, Gödöllő, 2022.
4. Nagy András: *Oil degradation and engine wear due to alternative fuels*. Széchenyi István University, Doctoral School of Multidisciplinary Engineering, Győr, 2022.
5. Forberger Árpád: *Digitálisan vezérelt dinamikai rendszerek (Digitally controlled dynamic systems)*. Budapest University of Technical and Economics, Budapest, 2021.
6. N. Nagasubramanian: *Numerical studies on conjugate free convection in baffle attached square enclosure using Al_2O_3 / water nanofluid.* Anna University, Chennai, India, 2020.
7. Ashok Kumar Bhardwaj: *Design, development and investigation of an indirect solar dryer for medicinal herbs of himalayan region*. Shoolini University, Solan, India, 2019.
8. K. J. Nagarajan: *Extraction, preparation and charaterization of macro, micro and nano size cellulose fibers from Cocous Nucifera Var-Aurantiaca peduncle and its polymer composites*. Anna University, Chennai, India, 2019
9. John Leon*: Studies on electroless Ni-b/Ni-B-ZrSiO4 for marine application*. Kalasalingam University, Krishnankoil, India, 2018.
10. P. Sunil Kumar: *Investigations on dimensionality reduction techqniues and certain post classifiers for epilepsy risk level classification from EEG signals with telemedicine application*. Anna University, Chennai, India, 2017.

Member in PhD committees:

1. Kozma István: *Járműipari kompozit szerkezetek szterológiai jellemzésének új módszerei (New methods for sterological characterization of automotive composite structures)*. Széchenyi István University, Multidisciplinary Doctoral School of Engineering, Győr, 2019.
2. Walid Mohammed Abdel-Magid Abdel-Motalb Belal: Axial flow turbine for solar updraft towers. Hungarian University of Agriculture and Life Sciences, Doctoral School of Mechanical Engineering, Gödöllő, 2022.

Member in PhD complex exam:

1. Cen Xuanzehen: Subject: Multibody dynamics in Biomechanics. Óbuda University, Doctoral School on Safety and Security Sciences, Budapest, Hungary, 2023.
2. Song Yan: Subject: Motion analysis in Biomechanics. Óbuda University, Doctoral School on Safety and Security Sciences, Budapest, Hungary, 2022.
3. Yao Meng: Subject: Motion analysis in Biomechanics. Óbuda University, Doctoral School on Safety and Security Sciences, Budapest, Hungary, 2022.
4. Rohit Khargotra: Subject: Composites. University of Pannonia, Chemical Engineering and Material Sciences Doctoral School, Veszprém, Hungary, 2022.
5. Vecseri András*:* Subject: Vibration. Óbuda University, Doctoral School on Safety and Security Sciences, Budapest, Hungary, 2019.
6. Szuchy Péter*:* Subject: Vibration. Óbuda University, Doctoral School on Safety and Security Sciences, Budapest, Hungary, 2019.

Activity in students' research (TDK):

1. Ahmed Anood: *Numerical modeling of wear in knee joints*. OASIS 2019 Conference. **2. place**. Doha, Katar, 2019.
2. Ahmed Anood: *Numerical modeling of wear in knee joints*. Erdélyi Műszaki Tudományos Diákköri Konferencia, Poster section: **1. place**. Temesvár (Timisoara), Romania, 2019.
3. Shen Siqin: *Effect of bionic high-heeled shoes on biomechanics of lower limbs*. Erdélyi Műszaki Tudományos Diákköri Konferencia, Poster section: **Special award**. Temesvár (Timisoara), Romania, 2019.
4. Rozs Richárd: *A térdízületi kopás vizsgálata numerikus modellekkel.* OTDK 2019, Biomechanika, Biomechatronika 3. Section: **Special award**, Budapest, 2019.
5. Rozs Richárd: *Kopás numerikus modellezése műanyag-acél kapcsolat között többtest-dinamikai módszerrel.* Anyagtudományi- és Gyártástechnológiai Szekció – **1. place**. ELTE Informatikai Kar, Savaria Műszaki Intézet, Szombathely, 2018.

BSc supervisor, reviewer activities (internal and external)

Name	Title of BSc thesis, university, year	Activity
Varga Dávid	*Egyszerű hővezetéses feladat analitikus és numerikus megoldása*. Eötvös Loránd Tudományegyetem, 2022.	External supervisor
Fülöp Bence	*Integrált kormányzás, szögszenzor koncepció készítése*. Eötvös Loránd Tudományegyetem, 2022.	Internal supervisor
Kádár Dániel	*Automata darab adagolás a melegültető sorokon*. Eötvös Loránd Tudományegyetem, 2020.	Internal supervisor
Kiss Virág	*Termelési kapacitás növelése gyártósor áttervezéssel*. Eötvös Loránd Tudományegyetem, 2020.	Internal supervisor
Gubicza Dóra	*Kazán méretezés.* Eötvös Loránd Tudományegyetem, 2020.	Internal supervisor
Rozs Richárd	*Kopás numerikus modellezése műanyag-acél kapcsolat között többtest-dinamikai módszerrel.* Eötvös Loránd Tudományegyetem, 2018.	Internal supervisor
Orbán Tamás	*Lakkbevonatos rézhuzal szigetelés eltávolítás technológiájának elemzése, fejlesztése*. Eötvös Loránd Tudományegyetem, 2018.	Internal supervisor
Gyuricza Róbert József	*Idegenárú ellenőrzési folyamat felülvizsgálata technikai, gazdasági és minőségbiztosítási szempontok alapján.* Eötvös Loránd Tudományegyetem, 2018.	Internal reviewer
Gyuricza Róbert József	*Idegenárú ellenőrzési folyamat felülvizsgálata technikai, gazdasági és minőségbiztosítási szempontok alapján.* Eötvös Loránd Tudományegyetem, 2018.	Internal reviewer
Szakály Adrienn	*Gépkockázati besorolási rendszerek és karbantartási stratégiák fejlesztése.* Eötvös Loránd Tudományegyetem, 2018.	Internal reviewer
Mészáros Bálint	*Kéttömegű lendítőkerék gyártás átállásának optimalizációja a LUK Savaria Kft-nél.* Eötvös Loránd Tudományegyetem, 2018.	Internal reviewer
Kóbor Tamás	*Commercial DOA arány csökkentése a HP Optinet üzletágon.* Eötvös Loránd Tudományegyetem, 2018.	Internal supervisor
Nagy Zsófia	*Clodius vállalatirányítási rendszer bevezetése a Szilassy és Türk Kft-nél.* Eötvös Loránd Tudományegyetem, 2017.	Internal reviewer
Kulcsár András	*LUK Savaria Kft. tesztműhely új beruházása.* Nyugat-magyarországi Egyetem, 2017.	Internal reviewer
Déri Evelyn	*Szegecsek minőségi problémáinak elemzése és a beszállítói kör optimalizálása.* Nyugat-magyarországi Egyetem, 2017.	Internal reviewer
Nagy Antal	*A használati melegvíz készítése napkollektorral a Szombathelyi Távhő Szolgáltató Kft.-nél.* Nyugat-magyarországi Egyetem, 2017.	Internal reviewer
Zahorecz Martin	*Folyamat-optimalizálás és munkahely kialakítás a Lean menedzsment eszközeinek alkalmazásával.* Nyugat-magyarországi Egyetem, 2016.	Internal reviewer
Bodorkós Bernadett	*Reklamációt okozó folyamatok optimalizálása a kuplunggyártás területén (minőségbiztosítás oldaláról).* Nyugat-magyarországi Egyetem, 2016.	Internal reviewer

Editorial activity

- *Editor:* Physical Activity and Health. Published by Ubiquity Press, Q2 in Scopus
- *Guest editor*: Coatings: Special Issue "Wear Behavior of Polymer Composites". Impact Factor (2019): 2.4, indexed in SCOPUS.
- *Guest editor*: Journal of Medical Imaging and Health Informatics: Special Issue on *"Informatics of Motor system and Exercise Science in Grand Health Research".* Impact Factor (2016): 0.877, indexed in SCOPUS.
- *Member of the international board:* Acta Technica Jaurinensis. Published by Széchenyi István University

Stipends and their results

2022.08.06-20 Université libre de Bruxelles, Bio, Electro and Mechanical System, Brüsszel, Belgium: Sharing experiences and expanding new education possibilities via ERASMUS+ program.

2021.07.01-14 Université libre de Bruxelles, Bio, Electro and Mechanical System, Brüsszel, Belgium: Sharing experiences and expanding new education possibilities via ERASMUS+ program.

2020.01.21-23 Institut für Technische und Numerische Mechanik, Stuttgart, Germany. Visiting the department in order to gain new methods in the education of applied mechanics, especially in multibody dynamics. Discussion of possible coopeartion with Prof. Dr. Peter Eberhard.

2020.01.07-14. Ningbo University, Research Academy of Grand Health, Ningbo, China. Scientific discussion about project-cooperation with the Prof. Dr. Yaodong Gu, Dean of the Faculty of Sport Science and Dr. habil. István Bíró, Dean of the Faculty of Engineering, Szeged Universty. Preparation for the visit and stay of PhD students. Visit at the Ningbo Number 9 Hospital to extend cooperation with Prof. Dr. Pinan Qian.

2019.07.02-12 Université libre de Bruxelles, Bio, Electro and Mechanical System, Brüsszel, Belgium: ERASMUS+ program: biomechanical research between the ELTE and the ULB, which includes sharing experiences in biomechanical research and writing a joint scientific article.

2019.05. Ningbo University, Research Academy of Grand Health, Ningbo, Kína. Discussion on a joint research project between the University of Ningbo, ELTE and the University of Szeged (represented by Dr. habil. István Bíró, dean).

2018.12. Ningbo University, Research Academy of Grand Health, Ningbo, China. Scientific discussion about project-cooperation with the Prof. Dr. Yaodong Gu, Dean of the Faculty of Sport Science. Preparation for the visit and stay of PhD students.

2018.06. CEEC-China Investment and Trading Expo. Representing the English course offered by the ELTE at the Expo, representing Hungary at the formal meeting of the V4 Rectors and the President of Ningbo University.

2017.07. Université libre de Bruxelles, Bio, Electro and Mechanical System, Brussels, Belgium: visiting professor position (*Fonds de la Recherche Scientifique* (www.fnrs.be)), research activity in biomechanics.

2017.02.12-18 Ningbo University, Research Academy of Grand Health, Ningbo, China: Official visiting professor of the Research Academy from 2017. Starting a bilateral research project in foot mechanics, and classes in biomechanics at the Academy. One graduated master student from Ningbo University (SUN Dong) starts his PhD work at the ELTE Campus of Szombathely via inter-state scholarship. First publications. Preparation and discussion of Chinese students starting mechanical Engineering BSc course at the Savaria Institute of Technology, ELTE.

2016.05.25-29 Ningbo University, Ningbo, China: Guest lecturer, classes for Chinese students about biomechanical modeling, preparation and discussion of the future scientific work of Chinese PhD students in Hungary.

2010-2013 Universiteit Gent, Ghent, Belgium: Doctoral studies in a joint PhD program.

Scientific reviewer

- Applied Bionics and Biomechanics
- Sports MDPI
- Journal of Experimental & Theoretical Artificial Intelligence
- Arabian Journal of Chemistry
- Clinical Biomechanics
- Experimental Techniques
- Advances in Mechanical Engineering
- Acta Physiologica Hungarica
- Medical Engineering & Physics
- Journal of Medical Imaging and Health Informatics
- Journal of Biomimetics, Biomaterials and Biomedical Engineering
- Composites Part B: Engineering
- Journal of Computational and Applied Mechanics
- Acta Technica Jaurinensis

Member in scientific committees

- XXIII. Technical Student Conference of Transylvania: Jury member (*mechanical engineering section*)
- XXVII. Scientific Session of Young Technical Scientists: Chair (*Engineering and Safety section*)
- XXXV. National Technical Student Conference: Chair (*Biomechanics, Biomechatronics section*)
- XXXIV. National Technical Student Conference: Jury member (*Biomechanics, Biomechatronics 3. section*),
- XXII. Technical Student Conference of Transylvania: Chair (*mechanical engineering section*)
- XXI. Technical Student Conference of Transylvania: Jury member (*mechanical engineering section*)
- XX. Technical Student Conference of Transylvania: Jury member (*mechanical engineering section*)
- XIX. Technical Student Conference of Transylvania: Jury member (*mechanical engineering section*)
- XVII. Technical Student Conference of Transylvania: Chair (*mechanical engineering section*)
- Hungarian Academy of Sciences (MTA): General assembly member. Section of Engineering Sciences, Committee on Theoretical and Applied Mechanics

ACADEMIC AWARDS

2022 **ELTE Promising Researcher Award**

Eötvös Loránd University - Scientific Council: Informatics Sciences

2022 **Dr. Gyenge Csaba Award for outstanding research activity**

Transylvanian Museum Association, Technical Sciences Division, Cluj (Romania), 2022.03.17.

2021 **Bolyai János Research Scholarship „ Numerical analysis of wear in knee prostheses to predict and prevent failure”.** Identifier: BO/00047/21/6

3 years, ELTE IK, Budapest, Hungary

2021 **Bolyai+ Scholarship for Young Researchers in Higher Education - ÚNKP-21-5-ELTE-1108**

1 year, ELTE IK, Budapest, Hungary

2021 **Scholarship for „Implementation of the priority research, education development and human resources goals of the Faculty of Informatics at the Eötvös Loránd University”**

5 months, ELTE IK, Budapest, Hungary

2020 **Scholarship for „Implementation of the priority research, education development and human resources goals of the Faculty of Informatics at the Eötvös Loránd University”**

5 months, ELTE IK, Budapest, Hungary

2019 **Scholarship for „Implementation of the priority research, education development and human resources goals of the Faculty of Informatics at the Eötvös Loránd University”**

5 months, ELTE IK, Budapest, Hungary

2018 **Scholarship for „Implementation of the priority research, education development and human resources goals of the Faculty of Informatics at the Eötvös Loránd University”**

5 months, ELTE IK, Budapest, Hungary

2017 **New National Excellence Program (Új Nemzeti Kiválóság Program)**

Wear modeling in the tibiofemoral connection

5 months, Ministry of Human Resources, Budapest, Magyarország

ELTE IK, Budapest, Hungary

PUBLICATIONS

	MTMT	Scopus	Web of Science
Independent citations	1146	1069	1155
Independent Hirsch index	20	20	20
Σ Impact factor	260		

MTMT2 link: https://m2.mtmt.hu/gui2/?type=authors&mode=browse&sel=10035924

Scopus link: https://www.scopus.com/authid/detail.uri?authorId=41761338200

Web of Science link: https://app.webofknowledge.com/author/record/2135642,34712769?lang=en_US

ORCID: https://orcid.org/0000-0002-6138-8382

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