



Şcoala Doctorală Interdisciplinară  
(SDI)

Domeniul de doctorat:

Inginerie mecanică

Conducător doctorat:

Silviu BUTNARIU

## TEME (TEMATICĂ) PENTRU CONCURS

**TEMA 1:** *Sisteme de urmărire a mişcării corpului uman*

### Conţinut / Principalele aspecte abordate

*Urmărirea şi analiza posturii corpului conducătorului auto şi a pasagerilor în diverse ipostaze (diferite autovehicule, sporturi cu / fără motor) folosind senzori inerţiali /optici / magnetici / mecanici în vederea optimizării poziţiei sau din considerente medicale.*

### Bibliografie recomandată:

1. C. R. Wren, A. Azarbayejani, T. Darrell and A. P. Pentland, "Pfinder: real-time tracking of the human body," in IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 19, no. 7, pp. 780-785, Jul 1997.
2. Thomas B. Moeslund, Erik Granum, A Survey of Computer Vision-Based Human Motion Capture, Computer Vision and Image Understanding, Volume 81, Issue 3, March 2001, Pages 231-268
3. D.M Gavrilă, The Visual Analysis of Human Movement: A Survey, Computer Vision and Image Understanding, Volume 73, Issue 1, 1 January 1999, Pages 82-98
4. Greg Mori, Jitendra Malik, Estimating Human Body Configurations Using Shape Context Matching, European Conference on Computer Vision, ECCV 2002: Computer Vision — ECCV 2002 pp 666-680
5. Butnariu, S., VR technologies for scanning, 3D reconstruction and tracking-lecture notes, CD, ISBN: 978-973-131-340-5, Ed. Lux Libris, 2016
6. <http://spine.unitbv.ro/>

### Note /Precondiţii / Obs:

*Absolvenţi ai programelor de studiu de Ingineria Autovehiculelor, Inginerie Mecanică, Mecatronică, Robotică, Inginerie Electrică  
Cunoştinţe de programare*

**TEMA 2:** *Îmbunătăţirea metodelor de reconstrucţie 3D*

### Conţinut / Principalele aspecte abordate

*Creşterea calităţii informaţiilor obiectelor 3D reconstruite digital prin implementarea componentelor de engineering, cu aplicaţii în ingineria auto / restaurare arheologică /*

*culturală / medicină. Utilizarea tehnicilor CAE: transformarea volumelor / suprafețelor reconstruite 3D în modele virtuale ce pot fi analizate cu aplicații software dedicate.*

**Bibliografie recomandată:**

1. Butnariu S., Analysis of mechanical structures using finite element method, lecture notes, ISBN 978-606-19-0311-5 (CD), Ed. Universitatii Transilvania din Brasov, 2013
2. Butnariu, S., Mogan, Gh., Analiza cu elemente finite în ingineria mecanică.. Aplicații practice în ANSYS, Ed. Universității Transilvania, ISBN 978-606-19-0474-7 (print), 2014
3. Butnariu, S., VR technologies for scanning, 3D reconstruction and tracking-lecture notes, CD, ISBN: 978-973-131-340-5, Ed. Lux Libris, 2016
4. Grigore C. Burdea, Philippe Coiffet, Virtual Reality Technology, 2nd Edition, ISBN: 978-0-471-36089-6, July 2003, Wiley-IEEE Press

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Cunoștințe de programare*

**Conducător doctorat:**

Prof.dr.ing. Silviu BUTNARIU





Transilvania  
University  
of Brasov

## ADMISSION TO DOCTORAL STUDIES

2020-2021

Session September 2020

**Interdisciplinary Doctoral School  
(SDI)**

**Field of doctoral studies:**

Mechanical Engineering

**PhD supervisor:**

Silviu BUTNARIU

### TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES

#### **TOPIC 1:** *Human body tracking systems*

##### **Content / Main aspects to be considered -**

Tracking and analyzing the human body posture of the driver and passengers in various situations (different cars, sports with / without motor) using inertial / optical / magnetic / mechanical sensors in order to optimize the position or for medical reasons.

##### **Recommended bibliografy:**

1. C. R. Wren, A. Azarbayejani, T. Darrell and A. P. Pentland, "Pfinder: real-time tracking of the human body," in IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 19, no. 7, pp. 780-785, Jul 1997.
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##### **Prerequisites / Remarks:**

*Graduates of study programs in Automotive Engineering, Mechanical Engineering, Mechatronics, Robotics, Electrical Engineering  
Programming knowledge*

#### **TOPIC 2:** *Improving 3D reconstruction methods*

##### **Content / Main aspects to be considered**

*Increasing the quality of information of 3D digital objects rebuilt by implementing engineering*

*components, with applications in automotive /archaeological / cultural / medical restoration. Using the CAE technics: transforming the rebuilt 3D volumes / surfaces into virtual models that can be analyzed with dedicated software applications.*

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1. Butnariu S., Analysis of mechanical structures using finite element method, lecture notes, ISBN 978-606-19-0311-5 (CD), Ed. Universitatii Transilvania din Brasov, 2013
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