Transilvania University of Brașov
INTERDISCIPLINARY DOCTORAL SCHOOL

ADMISSION TO DOCTORAL STUDIES Session September 2025

Field of doctoral studies: Mechatronics and Robotics
Doctoral supervisor: Prof. Dr. Sorin Grigorescu

TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES

TOPIC 1: *Robotic perception using graphs and artificial intelligence methods*
Recommended bibliography: [1] Sorin Grigorescu, Cosmin Ginerică, Machine Learning, Transilvania University, 2017. [2] Sorin Grigorescu, Computer Vision Systems, Transilvania University, 2018. [3] Richard Hartley, Andrew Zisserman, *Multiple View Geometry in Computer Vision*, Cambridge University Press, 2004. [4] Zachary Teed, Deng Jia, "DROID-SLAM: Deep Visual SLAM for Monocular, Stereo, and RGB-D Cameras", Advances in neural information processing systems NeurIPS, 2021. [5] Ian Goodfellow, Yoshua Bengio and Aaron Courville, Deep Learning, MIT Press, 2016. [6] Peter Corke, Robotics, Vision and Control, Springer, 2017. [7] Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani, Giuseppe Oriolo, Robotics: Modelling, Planning and Control, Springer, 2009.
☑ Scientific Doctorate (full-time only) ☑ Professional Doctorate (full-time or part-time)
☑ without tuition fee (state budget funded) ☑ with tuition fee or with funding from other sources than the state budget

TOPIC 2: *Real-time perception, mapping and localization for ground and aerial robots*
Recommended bibliography: [1] Sorin Grigorescu, Cosmin Ginerică, Machine Learning, Transilvania University, 2017. [2] Sorin Grigorescu, Computer Vision Systems, Transilvania University, 2018. [3] Richard Hartley, Andrew Zisserman, *Multiple View Geometry in Computer Vision*, Cambridge University Press, 2004. [4] Ian Goodfellow, Yoshua Bengio and Aaron Courville, Deep Learning, MIT Press, 2016. [5] Peter Corke, Robotics, Vision and Control, Springer, 2017.
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TOPIC 3: *Artificial intelligence methods for legged robots*
Recommended bibliography: [1] Sorin Grigorescu, Cosmin Ginerică, Machine Learning, Transilvania University, 2017. [2] Marc Raibert, Legged Robots that Balance, MIT Press, 1986. [3] Ian Goodfellow, Yoshua Bengio and Aaron Courville, Deep Learning, MIT Press, 2016. [4] Peter Corke, Robotics, Vision and Control, Springer, 2017. [5] Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani, Giuseppe Oriolo, Robotics: Modelling, Planning and Control, Springer, 2009.
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TOPIC 4: *Artificial intelligence methods for collaborative robotic control*
Recommended bibliography: [1] Sorin Grigorescu, Cosmin Ginerică, Machine Learning, Transilvania University, 2017. [2] Ian Goodfellow, Yoshua Bengio and Aaron Courville, Deep Learning, MIT Press, 2016. [3] Peter Corke, Robotics, Vision and Control, Springer, 2017. [4] Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani, Giuseppe Oriolo, Robotics: Modelling, Planning and Control, Springer, 2009.
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TOPIC 5: *Artificial intelligence methods for 3D perception in robotic systems*
Recommended bibliography: [1] Sorin Grigorescu, Cosmin Ginerică, Machine Learning, Transilvania University, 2017. [2] Sorin Grigorescu, Computer Vision Systems, Transilvania University, 2018. [3] Richard Hartley, Andrew Zisserman, *Multiple View Geometry in Computer Vision*, Cambridge University Press, 2004. [4] Ian Goodfellow, Yoshua Bengio and Aaron Courville, Deep Learning, MIT Press, 2016. [5] Peter Corke, *Robotics, Vision and Control*, Springer, 2017.

[6] Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani, Giuseppe Oriolo, *Robotics: Modelling, Planning and Control*, Springer, 2009.
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TOPIC 6: *Artificial intelligence methods for self-driving cars*
Recommended bibliography: [1] Sorin Grigorescu, Cosmin Ginerică, Machine Learning, Transilvania University, 2017. [2] Sorin Grigorescu, Computer Vision Systems, Transilvania University, 2018. [3] Richard Hartley, Andrew Zisserman, *Multiple View Geometry in Computer Vision*, Cambridge University Press, 2004. [4] Ian Goodfellow, Yoshua Bengio and Aaron Courville, Deep Learning, MIT Press, 2016. [5] Peter Corke, Robotics, Vision and Control, Springer, 2017. [6] Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani, Giuseppe Oriolo, Robotics: Modelling, Planning and Control, Springer, 2009.
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TOPIC 7: *Unsupervised learning for perception and control in robotics*
Recommended bibliography: [1] Sorin Grigorescu, Cosmin Ginerică, Machine Learning, Transilvania University, 2017. [2] Sorin Grigorescu, Sisteme de Vedere Artificială, Editura Universității Transilvania, 2018. [3] Ian Goodfellow, Yoshua Bengio and Aaron Courville, Deep Learning, MIT Press, 2016. [4] Peter Corke, Robotics, Vision and Control, Springer, 2017. [5] Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani, Giuseppe Oriolo, Robotics: Modelling, Planning and Control, Springer, 2009.
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TOPIC 8: *Artificial intelligence methods for reasoning in robotic systems*
Recommended bibliography:

[1] Sorin Grigorescu, Cosmin Ginerică, Machine Learning, Transilvania University, 2017.
[2] Sorin Grigorescu, Sisteme de Vedere Artificială, Editura Universității Transilvania, 2018.
[3] Ian Goodfellow, Yoshua Bengio and Aaron Courville, Deep Learning, MIT Press, 2016.
[4] Peter Corke, Robotics, Vision and Control, Springer, 2017.
[5] Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani, Giuseppe Oriolo, Robotics: Modelling, Planning and Control, Springer, 2009.

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TOPIC 9: *Livelong learning of action primitives in legged robots*

Recommended bibliography:

[1] Sorin Grigorescu, Cosmin Ginerică, Machine Learning, Transilvania University, 2017.
[2] Sorin Grigorescu, Sisteme de Vedere Artificială, Editura Universității Transilvania, 2018.
[3] Ian Goodfellow, Yoshua Bengio and Aaron Courville, Deep Learning, MIT Press, 2016.
[4] Peter Corke, Robotics, Vision and Control, Springer, 2017.
[5] Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani, Giuseppe Oriolo, Robotics: Modelling, Planning and Control, Springer, 2009.

Doctoral supervisor,

Prof. Dr. Sorin Grigorescu

Coordinator of the field of doctoral studies,

Prof. Dr. Sorin Grigorescu