MÁRK SZIJÁRTÓ

GEOPHYSICIST, PH.D. MTMT: 10059904

workplace:	ELTE Institute of Geography and Earth Sciences Department of Geophysics and Space Science	
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EDUCATION, QUALIFICATIONS

2022	**Geophysics expert** (SZTFH-BANYASZ/1369-2/2022)
2022	Academic degree: **Ph.D. in earth science (hydrogeology)**. Title: *Numerical investigation of basin-scale groundwater flow and heat transport processes (link)*. qualification: summa cum laude. (P-6149/2022)
2021–	University of Óbuda **civil engineer** (BSc)
2017–2021	ELTE Doctoral School of Earth Sciences, Doctoral Program of Geology and Geophysics
2017	**Geophysics**, qualification: outstanding.
2015–2017	ELTE geophysicist (MSc)
2015	**Physicist**, qualification: outstanding.
2011–2015	ELTE **Physics** (BSc)
2011	HSC, Gergely Czuczor Benedictine High School and College, Győr

EXPERIENCES

2022–	ELTE Faculty of Sciences, Department of Geophysics and Space Science, *research fellow*
2021–2022	ELTE Faculty of Sciences, Institute of Geography and Earth Sciences, *pre-doctoral researcher*
2020–2021	ELGOSCAR-2000 Ltd., *geophysicist*
2020	Geological Survey of Finland (Espoo, Finland), *visiting researcher* (50 days)
2018–	József and Erzsébet Tóth Hydrogelogy Endowed Chair, *lecturer*
2017–	Hórukk Ltd., *co-owner*

RESEARCH TOPICS

Climate change

RRF-2.3.1-21-2022-00014 National Multidisciplinary Laboratory for Climate Change ELTE Department of Geology, 2022– (*collaborator*)

Numerical modeling of groundwater flow systems

Numerical modelling of topography and thermal convection-driven subsurface water flow in a real karst environment in the Buda Thermal Karst, ÚNKP-18-3, ELTE Department of Geology, 2018–2019. (HU) (*principal investigator*)

ENeRAG – Excellency Network Building for Comprehensive Research and Assessment of Geofluids, H–2020, ELTE Department of Geology – Department of Mineralogy–Department of Geophysics and Space Science, 2018–2021. (HU) (*collaborator*)

Numerical investigation of thermohaline convection in a porous medium model, ÚNKP-19-3, ELTE Department of Geophysics and Space Science, 2019–2020. (HU) (*principal investigator*)

Support for groundwater and geological remediation using numerical methods, KDP-2020, ELTE Department of Geophysics and Space Science, ELOGSCAR-2000 Ltd., 2020–2021. (HU) (*principal investigator*)

Three-dimensional modelling of groundwater flow and heat transport in synthetic and real hydrogeological systems, ÚNKP-21-4, ELTE Institute of Geography and Earth Sciences, 2021-2022. (HU) (*principal investigator*)

Investigation of the coupled age calculation and two- and three-dimensional heat transfer processes from theoretical groundwater flow models to the Buda Thermal Karst system, OTKA-PD-142660, ELTE Department of Geophysics and Space Science, 2022- (EN-HU) (*principal investigator*)

Geothermics

Towards the high resolution 3D geothermal model of Hungary: renewal of the geothermal database and its applications, OTKA K–129279 (NRDI), Department of Geophysics and Space Science, 2018–2022. (EN-HU) (*collaborator*)

Exploitation of shallow geothermal energy with borehole heat exchanger: geological and technological parameters, MBFSZ/882/2020, 2020. (HU) (*contributor*)

Archaeological geophysics

Cultural and material heritage on the Eastern limes of Roman Dacia, Blended Intensive Program (BIP), Humboldt University – Babes-Bolyai University– BME – PPKE – ELTE, 2022. (EN-RO-HU) (*lecturer*)

SCHOLARSHIPS

2022– "OTKA" postdoctoral excellence programme (OTKA-PD), National Research, Development and Innovation Office

2021–2022 New National Excellence Program (ÚNKP-21-4), Ministry for Innovation and Technology from the source of the National Research, Development and Innovation Fund

2019–2020 New National Excellence Program (ÚNKP-19-3), Ministry for Innovation and Technology from the source of the National Research, Development and Innovation Fund

2020–2021 Doctoral Student Scholarship Program of the Co-operative Doctoral Program (KDP-2020), Ministry for Innovation and Technology from the source of the National Research, Development and Innovation Fund

2018–2019 New National Excellence Program (ÚNKP-18-3), Ministry for Innovation and Technology from the source of the National Research, Development and Innovation Fund

AWARDS

2022 *AGOCS Geophysical Research Fund*
Committee of William B. and Elizabeth Behr Agocs Geophysical Research Fund for the PhD degree

2022 *„Article of the year" Attila Meskó Award*
Scientific Committee of the Association of Hungarian Geophysicists for Szijártó & Galsa (2020)

2020 *„Article of the year" Attila Meskó Award*
Scientific Committee of the Association of Hungarian Geophysicists for Szijártó et al., (2019)

2017 *AGOCS Geophysical Research Fund*
Committee of William B. and Elizabeth Behr Agocs Geophysical Research Fund for MSc degree

TEACHING EXPERIENCES

2017– Fluids in geology, Geology MSc, *co-lecturer*

2018– Geoelectric surveying methods, Earth Scientist BSc, *co-lecturer*

2018– Hydrogeology field trip, Geology MSc, *lecturer*

2018– Geophysics field trip, Geophysics MSc, *lecturer*

2020– Visualisation of research results, Earth Scientist BSc, *lecturer*

2021– Preparation for field trip, Geophysics MSc, *lecturer*

2021– Geoinformatics and software skills, Geology MSc, *lecturer*

SUPERVISING

2019– A total of 6 students have defended their thesis under my guidance.

2021– National Conference of National Scientific Students' Association: Bence Egey (winner, 2021); Conference of National Scientific Students' Association Soma Oláh (ELTE winner, 2022)

MEMBERSHIP

2015– SEG, Society of Exploration Geophysicists
(*faculty advisor of Eötvös Student Chapter from 2022*)

2017– József and Erzsébet Tóth Hydrogeology Endowed Chair
(*researcher*)

2018– EGU, European Geosciences Union

2018– IAH, International Association of Hydrogeologists

2018– MGE, Association of Hungarian Geophysicists

2019– ELTE Faculty of Sciences, Council of Scientific Students' Association

2022– Hungarian Academy of Sciences, Public Body

PUBLICATIONS

Szabó, Zs., **Szijártó, M.**, Tóth, Á., Mádl-Szőnyi, J. 2023. The Significance of Groundwater Table Inclination for Nature-Based Replenishment of Groundwater-Dependent Ecosystems by Managed Aquifer Recharge. Water 15(6), 1077, https://doi.org/10.3390/w15061077

Tóth, Á.. Baják, P., **Szijártó, M.**, Tiljander, M., Korkka-Niemi, K., Hendriksson, N., Mádl-Szőnyi, J. 2023. Multimethodological Revisit of the Surface Water and Groundwater Interaction in the Balaton Highland Region—Implications for the Overlooked Groundwater Component of Lake Balaton, Hungary. *Water*, 15(6), 1006, https://doi.org/10.3390/w15061006

Korhonen, K.M., Markó, Á., Bischoff, A., **Szijártó, M.**, Mádl-Szőnyi, J. 2023. Infinite borehole field model—a new approach to estimate the shallow geothermal potential of urban areas applied to central Budapest, Hungary. *Renewable Energy*, 208, 263-274., https://doi.org/10.1016/j.renene.2023.03.043

Czauner, B., Erőss, A., Szkolnikovics-Simon, Sz., Markó., Á., Baják, P., Trásy-Havril, T., **Szijártó, M.**, Szabó, Zs., Hegedűs-Csondor, K., Mádl-Szőnyi, J. 2022. From basin-scale groundwater flow to integrated geofluid research in the hydrogeology research group of Eötvös Loránd University, Hungary. *Journal of Hydrology X*, 17, 100142, https://doi.org/10.1016/j.hydroa.2022.100142

Galsa, A. Herein, M., **Szijártó, M.,** Süle, B., Lenkey, L. 2022. From mantle convection to groundwater flow modelling: In memoriam Prof. László Cserepes (1952-2002). *Hungarian Geophysics*, 63(4), 158-169

Váradi, K., Bereczki, L., **Szijártó, M.**, Fodor, L. 2022. Investigation of the Miocene extensional stuctures of the Slovakian-Hungarian Danube Basin. *Hungarian Geophysics*, 63(4), 208-224

Galsa, A., Tóth, Á., Szijártó, M., Pedretti, D., Mádl-Szőnyi, J. 2022. Interaction of basin-scale topography- and salinity-driven groundwater flow in synthetic and real hydrogeological systems. Journal of Hydrology, 609, 127695, doi: 10.1016/j.ejrh.2021.100783

Szijártó, M., Galsa, A., Tóth, Á., Mádl-Szőnyi, J. 2021. Numerical analysis of the potential for mixed thermal convection in the Buda Thermal Karst, Hungary. *Journal of Hydrology: Regional Studies*, 34, 100783, doi: 10.1016/j.ejrh.2021.100783

Szijártó, M., Galsa, A. 2020. Thermohaline convection in a homogeneous porous medium. *Hungarian Geophysics*, 61(4), 177-190., doi: 10.5281/zenodo.4682836

Szijártó, M., Galsa, A., Tóth, Á., Mádl-Szőnyi, J. 2019. Numerical investigation of the combined effect of forced and free thermal convection in synthetic groundwater basins. *Journal of Hydrology*, 572, 364-379., doi: 10.1016/j.jhydrol.2019.03.003

Szijártó, M., Balázs, L., Drahos, D., Galsa, A. 2017. Numerical sensitivity test of three-electrode laterolog borehole tool. *Acta Geophysica*, 65, 701-712., doi: 10.1007/s11600-017-0063-4

LAST FIVE CONFERENCE ABSTRACTS

Szijártó, M., Vatai, Zs., Galsa, A. 2023. Numerical investigation of the groundwater age and heat transport processes in asymmetric hydrogeological situations. *EGU General Assembly 2023*, EGU2023-3840.

Szijártó, M., Galsa, A., Tóth, Á., Mádl-Szőnyi, J. 2021. Role of coupled fluid flow and heat transfer in synthetic and real groundwater flow systems. *International Symposium on Geofluids* Abstract volume, pp. 88.

Szijártó, M., Galsa, A. 2020. Interaction of temperature- and salinity-driven natural convection in homogeneous porous media. *EGU General Assembly 2020*, EGU2020-9896.

Szijártó, M., Galsa, A., Tóth, Á., Lenkey, L., Mádl-Szőnyi, J. 2019. Numerical investigation of combined effect of different driving forces in the Buda Thermal Karst. *IAH Congress*, Malaga, Spain, 503.

Szijartó, M., Galsa, A., Tóth, Á., Lenkey, L., Mádl-Szőnyi, J. 2019. Numerical investigation of the combined effect of different driving forces in the Buda Thermal Karst, Hungary. *EGU General Assembly 2019*, EGU2019-5830.

EDUCATIONAL PRESENTATIONS IN HUNGARIAN

Szijártó M. 2021. Vajon mi áramlik a talpunk alatt? A felszín alatti vízáramlásról röviden, egy geofizikus szemüvegén keresztül. Magyarhoni Földtani Társulat: Földtudományos Forgatag – 2021.

Szijártó M. 2021. Vajon mi áramlik a talpunk alatt? A felszín alatti vízáramlásról röviden, egy geofizikus szemüvegén keresztül. Földtudományi Civil Szervezetek Közössége: Föld napja – 2021.

Szijártó, M. 2020. Beszámoló egy sikeres tudományos diákköri konferenciáról, nem csak geofizikusoknak, egy geofizikus szemüvegén keresztül. Magyar Geofizika, 61(3), 158-160.

Szijártó, M. 2020. Felszínalatti hőszoszlopok nyomában. ELTE TTK Hírek (https://ttk.elte.hu/content/felszin-alatti-hooszlopok-nyomaban.t.2745)

Szijártó, M. 2019. Kapillaritás-kutatások. Eötvös 100 – Diákok az Akadámián 3., Magyar Tudományos Akadémia (https://mta.hu/esemenynaptar/2019-11-28-eotvos-100-diakok-az-akademian-3-3141)

Szijártó, M. 2019. Hő- és tömegtranszport folyamatok medenceléptékű numerikus értelmezése. Az új generáció – doktoranduszok eredményei a geofizikában, Magyar Tudományos Akadémia

PERSONAL COMPETENCES

LANGUAGE

English – B2 (2018)
German –B2 (2012)

SOFTWARE SKILLS

COMSOL Multiphysics, Matlab, Mathcad
WellCad
Geotomo, Zond softwares
QGIS, AutoCAD
Microsoft Word, Excel
CorelDraw, Surfer, Grapher, Voxler
Windows, Linux

OTHER

Driving licences: A, B