

# Curriculum Vitae



## Personal information

*First name / Surname* **Boglárka Babcsány**  
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## Work experience

<i>Date</i>	September 2017 –
<i>Position held</i>	assistant professor (July 2022 – ), research assistant (September 2017 – June 2022)
<i>Main activities and responsibilities</i>	giving lectures on Thermal-hydraulics, Basics of Nuclear Energy and Reactor Physics Calculations, carrying out R&D activities in reactor physics, reactor physics code development in MATLAB, Python and Fortran, supervising BSc, MSc and postgraduate theses, as well as Scientific Student Conference research projects
<i>Name and address of employer</i>	Budapest University of Technology and Economics, Institute of Nuclear Techniques 9 Műegyetem Quay, 1111 Budapest, Hungary
<i>Sector</i>	Academic education and research
<i>Date</i>	July 2015 – February 2019
<i>Position held</i>	chief technical expert (September 2018 – February 2019), technical secretary (July 2015 – August 2018)
<i>Main activities and responsibilities</i>	engineering tasks related to the environmental and site licensing, contractual and EU obligations of the Paks II. project
<i>Name and address of employer</i>	Paks II. Ltd.   Prime Minister's Office, State Secretariat for the Maintenance of the Capacity of the Paks Nuclear Power Plant, 5 Bihari J. Street, 1055 Budapest, Hungary
<i>Sector</i>	Energy industry – Electricity
<i>Date</i>	January 2015 – June 2015
<i>Position held</i>	assistant research fellow
<i>Main activities and responsibilities</i>	deterministic reactor safety calculations for shutdown states of the Paks NPP with the MAAP code for Level 2 PSA
<i>Name and address of employer</i>	NUBIKI Ltd. (Nuclear Safety Research Institute) 6 <sup>th</sup> building, 29-33 Konkoly-Thege Miklós Street, 1121 Budapest, Hungary
<i>Sector</i>	Research
<i>Date</i>	November 2013 – December 2013
<i>Position held</i>	trainee
<i>Main activities and responsibilities</i>	MCNP simulations of neutron noise measurements carried out on subcritical systems
<i>Name and address of employer</i>	Nuclear Engineering Group, Applied Physics Department, Chalmers University of Technology, 4 Fysikgården, SE-41296 Gothenburg, Sweden
<i>Sector</i>	Academic research
<i>Date</i>	February 2012 – September 2014
<i>Position held</i>	instructor
<i>Main activities and responsibilities</i>	giving lectures on Basics of Nuclear Energy; Nuclear and Neutron Physics; Physics Laboratory and Energy Processes for students specialised in nuclear energy engineering and nuclear physics
<i>Name and address of employer</i>	Budapest University of Technology and Economics, Institute of Nuclear Techniques, 9 Műegyetem Quay, 1111 Budapest, Hungary; Department of Energy Engineering; 4-6 Bertalan Lajos Street, 1111 Budapest, Hungary
<i>Sector</i>	Academic education

<i>Date</i>	July – August 2012
<i>Position held</i>	trainee within the framework of summer internship for the Budapest University of Technology and Economics
<i>Main activities and responsibilities</i>	preparing an analytical model for calculation of the thermal behaviour of horizontal shell-and-tube heat exchangers
<i>Name and address of employer</i>	TÜV NORD SysTec GmbH & Co. KG, 31 Große Bahnstraße, 22525 Hamburg, Germany
<i>Sector</i>	Regulatory control of nuclear safety
<i>Date</i>	January – February 2012
<i>Position held</i>	trainee within the framework of internship program for the Corvinus University of Budapest
<i>Main activities and responsibilities</i>	Analysing the Final National Reports (“Stress Tests”) of VVER specific countries
<i>Name and address of employer</i>	Hungarian Atomic Energy Authority, 4 Fényes Adolf Street, 1036 Budapest, Hungary
<i>Sector</i>	Regulatory control of nuclear energy application
<b>Education and training</b>	
<i>Date</i>	September 2014 – September 2017 (absolutorium)
<i>Title of qualification awarded</i>	PhD in Physics (degree obtained in April 2022)
<i>Principal subjects covered</i>	Reactor physics code development – Finite element solution of the SP <sub>3</sub> equations
<i>Name of organisation providing education</i>	Budapest University of Technology and Economics, Doctoral School of Physics 3 Műegyetem Quay, 1111 Budapest, Hungary
<i>International classification</i>	Physics PhD
<i>Date</i>	January 2013 – July 2014
<i>Title of qualification awarded</i>	Physicist – Nuclear Techniques
<i>Principal subjects covered</i>	Nuclear physics, Neutron transport methods, Chemistry of Nuclear Power Plants, Nuclear Fuel Cycles
<i>Name of organisation providing education</i>	Budapest University of Technology and Economics
<i>International classification</i>	MSc in Physics
<i>Date</i>	September 2009 – January 2013
<i>Title of qualification awarded</i>	Nuclear Energy Engineer
<i>Principal subjects covered</i>	Reactor Physics, Thermo-hydraulics of Nuclear Reactors, Nuclear Measurement Techniques
<i>Name of organisation providing education</i>	Budapest University of Technology and Economics
<i>International classification</i>	Nuclear Energy Engineering BSc
<i>Date</i>	September 2008 – June 2012
<i>Title of qualification awarded</i>	Expert in International Relations
<i>Principal subjects covered</i>	International Politics, History, Law and Economy
<i>Name of organisation providing education</i>	Corvinus University of Budapest
<i>International classification</i>	International Studies BA
<i>Date</i>	September 2002 – June 2008
<i>Qualification awarded</i>	High School Leaving Certificate
<i>Principal subjects covered</i>	Higher level exam in Mathematics and Micro-Macro Economy
<i>Name of organisation providing education</i>	Szent István High School

## Knowledge of Languages

<i>Mother tongue</i>	Hungarian
<i>French</i>	Advanced Level (C1) with economic specialisation (May 2009)
<i>English</i>	Advanced Level (C1) (September 2007)

## Conferences

Participation in the International Conference on Physics of Reactors 2022 (PHYSOR 2022) with the presentations titled “*Comparative Analysis of Energy Deposition Modes Available in Serpent 2 Within the Framework of the SCWR-FQT Reactor Physics Benchmark*” and “*On the Effect of Scalar Flux Weighting of Linearly Anisotropic Scattering Matrices in Few-Group Transport Calculations*” (Pittsburgh, PA, USA, 15-20 May 2022)

Participation in the meeting of AER Working Group A and B with my presentation of “*SP<sub>3</sub> solution of the full-core VVER-440 RK3+ and VVER-1000 benchmarks using Serpent group constants and discontinuity factors*” (15 June 2021, online)

Participation in the 29<sup>th</sup> Symposium of AER on VVER Reactor Physics and Reactor Safety with my presentation of “*Finite element solution of the time-dependent SP<sub>3</sub> equations using an implicit integration scheme*” (14-18 October 2019, Energoland, Mochovce NPP, Slovakia)

Participation in the meeting of AER Working Group C and G with my presentation of “*Finite Element-Based SP<sub>3</sub>-Solver Development*” (25-26 May 2017, Balatonyörök, Hungary)

Participation in the 25<sup>th</sup> Symposium of AER on VVER Reactor Physics and Reactor Safety with my presentation of “*Hybrid Finite Element Solution of the Simplified P<sub>3</sub> equations*” (13-16 October 2015, Balatonyörök, Hungary)

Participation in the 23<sup>rd</sup> Symposium of AER on VVER Reactor Physics and Reactor Safety with my presentation of “*Methodologies for Determination the Activation of Steel Components and Concrete Structures of VVER-440 Type of Nuclear Power Plants*” (30 September – 4 October 2013, Štrbské Pleso, Slovakia)

Participation in the 4<sup>th</sup> International Youth Conference on Energy with my presentation of “*Is the new German energy policy sustainable?*” (6-8 June, 2013, Siófok, Hungary)

Participation in the meeting of AER Working Group C and G with the presentation of “*Methodologies for Determination the Activation of Steel Components and Concrete Structures of VVER-440 Type of Nuclear Power Plants*” (23 May 2013, Paks, Hungary)

Participation in the meetings “*Preparation of a Safety Report on Methodologies for Source Term Assessment and Dose Assessment for Decommissioning*” of the IAEA (22-26 April, 2013; 23-27 September, 2013; 26-28 March 2014; 26-30 January, 2015; Vienna, Austria)

## Prizes

Pro Progressio Foundation Scientific Student Conference Supervisory Scholarship (December 2021)

Supervisory Commendation for Scientific Student Conference research project supervision (November 2017)

Campus Mundi Short Study Mobility Scholarship (10 March – 9 April 2017)

WANO Nuclear Safety Scholarship (6 October 2015)

National Scholarship (September 2013 – June 2014)

Scientific Scholarship of the Faculty of Natural Sciences (February 2013)

Educational and instructor scholarship of the Foundation for the Future’s Nuclear Energy Engineers (February 2012; October 2012, February 2013, October 2013, February 2014, October 2014, October 2015, October 2016)

Special prize in the Scientific Student Conference with an analysis on the feasibility of the expansion of Paks Nuclear Power Plant in March 2012 (won special prize in April 2013 on national level)

Special prize in the Scientific Student Conference with an analysis of a model constructed for studying natural convection around an electrically heated fuel rod in horizontal duct in November 2012 (was national runner-up in April 2013)

## Publications

- B. Babcsányi, I. Pócs, Z. I. Böröczki, D. P. Kis, 2022. *Hybrid finite-element-based numerical solution of the  $SP_3$  equations –  $SP_3$  solution of two- and three-dimensional VVER reactor problems*. Annals of Nuclear Energy, 173 (2022)
- B. Babcsányi, V. Giusti, A. Moise, J. C. Chow, 2022. *Comparative Analysis of Energy Deposition Modes Available in Serpent 2 Within the Framework of the SCWR-FQT Reactor Physics Benchmark*. In Proceedings of International Conference on Physics of Reactors 2022 (PHYSOR 2022), Pittsburgh, PA, USA, 15-20 May 2022
- B. Babcsányi, Z. I. Böröczki, J. E. Maróri, M. Szieberth, 2022. *On the Effect of Scalar Flux Weighting of Linearly Anisotropic Scattering Matrices in Few-Group Transport Calculations*. In Proceedings of International Conference on Physics of Reactors 2022 (PHYSOR 2022), Pittsburgh, PA, USA, 15-20 May 2022
- B. Babcsányi, I. Pócs, D.P. Kis, 2021. *Hybrid finite-element-based numerical solution of the multi-group  $SP_3$  equations and its application on hexagonal reactor problems*. Annals of Nuclear Energy, 155 (2021)
- A. Sz. Ványi, B. Babcsányi, Z. I. Böröczki, A. Horváth, M. Hursin, M. Szieberth, Sz. Czifrus, 2021. *Steady-state neutronic measurements and comprehensive numerical analysis for the BME Training Reactor*. Annals of Nuclear Energy, 155 (2021)
- A. Aszódi, B. Babcsányi, 2021. *Site investigation in service of nuclear safety (in Hungarian)*. Magyar Tudomány, 182 (2021) 7
- B. Babcsányi, D. P. Kis, 2020. *Semi-analytical methods for  $SP_3$  equations solver verification including third-order scattering anisotropy*. Annals of Nuclear Energy, 148 (2020)
- B. Babcsányi, T. Bartók, D. P. Kis, 2020. *Finite element solution of the time-dependent  $SP_3$  equations using an implicit integration scheme*. Kerntechnik, 85 (2020) 4; 292-300.
- B. Babcsányi, T. Hajas, P. Mészáros, 2020. *Finite-element-based diffusion modeling of transient reactor physics processes (in Hungarian)*. Nukleon, XIII. (2020) 233
- B. Babcsányi, T. Bartók, D. P. Kis, 2019. *Finite element solution of the time-dependent  $SP_3$  equations using an implicit integration scheme*. In Proceedings of 29<sup>th</sup> Symposium of AER on VVER Reactor Physics and Reactor Safety, Energoland, Mochovce NPP, Slovakia, 14-18 October 2019.
- IAEA Safety Report (co-author), 2019. *Methodologies for Assessing the Induced Activation Source Term for Use in Decommissioning Applications*. Safety Reports Series No. 95.
- T. Hajas, P. Pandazis, L. Lovász and B. Babcsányi, 2017. *New finite element-based modelling of reactor core support plate failure*. Kerntechnik Volume 82 (2017) 6; pages 685-692.
- P. Pandazis, B. Babcsányi, 2016. *Numerical and experimental investigation of surface vortex formation in coolant reservoirs of reactor safety systems*. Kerntechnik, 81 (2016) 5; pages 477-483.
- B. Babcsányi, S. Fehér, I. Pócs, T. Parkó, 2015. *Hybrid Finite Element Solution of the Simplified  $P_3$  Equations*. In Proceedings of the 25<sup>th</sup> Symposium of AER on VVER Reactor Physics and Reactor Safety, Balatonyörök, Hungary, 13-16 October, 2015.
- B. Babcsányi, Sz. Czifrus, S. Fehér, 2015. *Methodology and conclusions of activation calculations of WWER-440 type nuclear power plants*. Nuclear Engineering and Design, Vol. 284, pages 228-237.
- B. Babcsányi, Sz. Czifrus, S. Fehér, 2013. *Methodologies for the determination of the activation of steel components and concrete structures of WWER-440 type nuclear power plants*. In Proceedings of 23<sup>rd</sup> Symposium of AER on VVER Reactor Physics and Reactor Safety, Štrbské Pleso, Slovakia, 30 September – 4 October, 2013.
- B. Babcsányi, 2013. *Is the new German energy policy sustainable?* In Proceedings of 4<sup>th</sup> International Youth Conference on Energy (IYCE 2013), Siófok, Hungary, 6-8 June 2013, IEEE Xplore Digital Library.

## Research Reports

ECC-SMART WP4, 2021: *D4.1: Neutron physics code selection results*. BME-NTI-976/2021.

B. Babcsányi, 2019: *Two-dimensional SP<sub>3</sub> modelling of the VVER-440 core*. BME-NTI-908/2019. (in Hungarian)

B. Babcsányi, M. Halász, 2018. *Analysing the possibilities for increasing the accuracy of the SP<sub>3</sub>-method integrated into the C-PORCA program*. BME-NTI-864/2018. (in Hungarian)

B. Babcsányi, S. Fehér, 2017. *Developing the accuracy of the SP<sub>3</sub>-method integrated into the C-PORCA program by taking into account anisotropic neutron scattering*. BME-NTI-826/2017. (in Hungarian)

S. Fehér, B. Babcsányi, 2014. *Further development of the HELIOS – C-PORCA code system with a module capable of the reactor physical characterisation of irregular geometric configurations, Part III. Testing and verification of the developed SP<sub>3</sub>-method*. BME-NTI-706/2014. (in Hungarian)

M. Szieberth, L. Nagy, B. Babcsányi, 2014. *Involvement in the evaluation of measurements conducted on the VENUS-F subcritical facility using neutron noise methods*. BME-NTI-693/2014. (in Hungarian)

I. Boros et al. (co-author), 2014. *Lessons learnt from the Fukushima accident on a national and international level, summary of the emergency preparedness practices*. BME-NTI-670/2014. (in Hungarian)

Sz. Czifrus, B. Babcsányi, 2013: *Analyses and calculations concerning the graphite applied in the BME Training Reactor*. BME-NTI-632/2013. (in Hungarian)

Sz. Czifrus, S. Fehér, B. Babcsányi, 2013 *Determination of the activity of the steel components and shielding concrete structures of the Armenian Nuclear Power Plant*. BME-NTI-609/2013. (in English)

## Prizes of supervised students

my student (Gergely Illés) won 2<sup>nd</sup> prize in the Scientific Student Conference with the work of “*Diffusion-based VVER core calculations with the SPNDYN finite element reactor physics code*” in November 2021

my student (Péter Mészáros) won special prize in the Scientific Student Conference with the work of “*Modeling of experiments performed on the BME Training Reactor with the DIREMO finite-element-based diffusion code*” in November 2020 (won special prize in April 2021 on national level)

my student (Tamás Hajas) won 2<sup>nd</sup> prize in the Scientific Student Conference with the work of “*Finite element analysis of reactor physics transients with a self-developed diffusion code*” in November 2019 (won 1<sup>st</sup> prize in April 2021 on national level)

my student (Tamás Hajas) won 2<sup>nd</sup> prize in the Scientific Student Conference with the work of “*Development of a finite element based solver for the time-dependent diffusion equation*” in November 2018

my student (Tamás Hajas) won 1<sup>st</sup> prize in the Scientific Student Conference with the work of “*Finite element modelling of corium induced core support plate failure*” in November 2017

## Workshops and other research activities

10 March – 9 April 2017, Internship at INVAP S.E., San Carlos de Bariloche, Argentina including a one-week cooperation with Instituto Balseiro, Centro Atómico Bariloche

3-7 October 2016: Training course on “*One-Dimensional Analytical Methods for Verification of Neutron Transport Algorithms*”; OECD NEA, Paris, France

15-26 August 2016: IAEA and ANL joint training course on “*Integrated Management Systems and Developing of the Safety Culture*”; Argonne, Illinois, USA