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István Szöllősi

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Work: Str. Mihail Kogălniceanu, nr. 1, 400084 Cluj-Napoca (Romania)

WORK EXPERIENCE

Babeş-Bolyai University – Cluj-Napoca, Romania

City: Cluj-Napoca | **Country:** Romania

Associate professor

[2025 – Current]

Courses and seminaries on the following topics:

- abstract algebra and linear algebra
- cryptography
- object oriented programming in C++
- advanced functional programming (in Haskell and Clean)
- parallel programming, GPGPU programming

Babeş-Bolyai University – Cluj-Napoca, Romania

City: Cluj-Napoca | **Country:** Romania

Lecturer professor

[2014 – 2025]

Courses and seminaries on the following topics:

- abstract algebra and linear algebra
- cryptography
- coding theory
- introduction to programming with C/C++
- data structures and algorithms
- object oriented programming

Babeş-Bolyai University – Cluj-Napoca, Romania

City: Cluj-Napoca | **Country:** Romania

Assistant

[2011 – 2014]

Courses and seminaries on the following topics:

- abstract algebra and linear algebra
- groups and symmetries
- cryptography
- coding theory
- discrete mathematics, combinatorics
- the methodology of research and the development of a scientific work

EDUCATION AND TRAINING

MSc (software engineering)

Eötvös Loránd University [2018 – 2020]

City: Budapest | **Country:** Hungary | **Website:** https://www.elte.hu/ | **Field(s) of study:** Information and Communication Technologies (ICTs) | **Level in EQF:** EQF level 7 | **National classification:** ISCED 7 | **Thesis:** Computer-assisted proof of the tree module property

- scientific advisor: dr. Kaposi Ambrus (Eötvös Loránd University)

PhD (mathematics)

Babeş-Bolyai University, Faculty of Mathematics and Computer Science [2008 – 2011]

Address: str. Mihail Kogălniceanu, nr. 1, 400084 Cluj-Napoca (Romania) | **Website:** http://www.ubbcluj.ro | **Field(s) of study:** Natural sciences, mathematics and statistics | **Level in EQF:** EQF level 8 | **National classification:** ISCED 8 | **Thesis:** Kronecker Modules and Matrix Pencils

- PhD advisor: Dr. Andrei Mărcuș (Babeș-Bolyai University)
- PhD student mobility:
    - St. Andrews University, Scotland (01/11/2010 - 30/06/2011)
    - scientific advisor: Dr. Olexandr Konovalov
- topic of the thesis: abstract algebra, computational algebra, representation theory

MSc (mathematics)

Babeş-Bolyai University, Faculty of Mathematics and Computer Science [2007 – 2008]

Address: str. Mihail Kogălniceanu, nr. 1, 400084 Cluj-Napoca (Romania) | **Website:** http://www.ubbcluj.ro | **Field(s) of study:** Natural sciences, mathematics and statistics | **Level in EQF:** EQF level 7 | **National classification:** ISCED 7 | **Thesis:** Natural Classes and Direct Sum Decompositions of Modules

- scientific advisor: dr. Septimiu Crivei (Babeş-Bolyai University)

BSc (computer science)

Babeş-Bolyai University, Faculty of Mathematics and Computer Science [2003 – 2007]

Address: str. Mihail Kogălniceanu, nr. 1, 400084 Cluj-Napoca (Romania) | **Website:** http://www.ubbcluj.ro | **Field(s) of study:** Information and Communication Technologies (ICTs) | **Level in EQF:** EQF level 6 | **National classification:** ISCED 4 | **Thesis:** Extensions of the GAP System

- scientific advisor: dr. Septimiu Crivei (Babeş-Bolyai University)

Bacalaureat

Bethlen Gábor National College [1999 – 2003]

Address: str. Bethlen Gábor, nr. 1, 515200 Aiud (Romania) | **Website:** http://www.bethlengabor.ro/ | **Level in EQF:** EQF level 4 | **National classification:** ISCED 3

Mathematics, computer science

LANGUAGE SKILLS

Mother tongue(s): Hungarian, Romanian

Other language(s):

English

LISTENING C2 **READING** C2 **WRITING** C2

SPOKEN PRODUCTION C2 **SPOKEN INTERACTION** C2

French

LISTENING C2 **READING** C2 **WRITING** C2

SPOKEN PRODUCTION C2 **SPOKEN INTERACTION** C2

German

LISTENING A2 **READING** A2 **WRITING** A2

SPOKEN PRODUCTION A2 **SPOKEN INTERACTION** A1

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user

PUBLICATIONS

[2025]

The Directed Cayley Diameter and the Davenport Constant (article in conference proceedings)

R. András, K. Cziszter, M. Domokos, I. Szöllősi, Recent Progress in Ring and Factorization Theory (ed. A. Geroldinger, B. Olberding, D. Smertnig), Springer, 2025, Pages 1-17, ISBN: 978-3-031-75326-8

[2024]

On some Ringel-Hall polynomials associated to tame indecomposable modules (ISI article)

Cs. Szántó, I. Szöllősi, Journal of Pure and Applied Algebra, Volume 228, Issue 5, 2024, 107555, ISSN 0022-4049

[2024]

Ringel–Hall polynomials associated to a quiver of type D4~ (ISI article)

Cs. Szántó, I. Szöllősi, Periodica Mathematica Hungarica, Volume 88, Issue 1, 2024, Pages 218-242, ISSN 1588-2829

[2023]

Combinatorial methods in the representation theory of finite dimensional tame algebras (book, monograph)

Cs. Szántó, I. Szöllősi, Cluj University Press, 2023, ISBN: 978-606-37-2010-9

[2022]

Tree representations of the quiver Dm~ (ISI article)

Sz. Lénárt, Á. Lőrinczi, Cs. Szántó, I. Szöllősi, Colloquium Mathematicum, Volume 167, 2022, Pages 261-302, ISSN 0010-1354

[2021]

Tree representations of the quiver E6~ (ISI article)

Sz. Lénárt, Á. Lőrinczi, I. Szöllősi, Colloquium Mathematicum, Volume 164, 2021, Pages 221-250, ISSN 0010-1354

[2021]

Schofield sequences in the Euclidean case (ISI article)

Cs. Szántó, I. Szöllősi, Journal of Pure and Applied Algebra, Volume 225, Issue 5, 2021, 106586, ISSN 0022-4049

[2020]

On some Hall polynomials over a quiver of type D4~ (ISI article)

Cs. Szántó, I. Szöllősi, Acta Universitatis Sapientiae, Mathematica, Volume 12, Issue 2, 2020, Pages 395-404, ISSN 1844-6094

[2018]

The Noether numbers and the Davenport constants of the groups of order less than 32 (ISI article)

K. Cziszter, M. Domokos, I. Szöllősi, Journal of Algebra, Volume 510, 2018, Pages 513-541, ISSN 0021-8693

[2017]

A short solution to the subpencil problem involving only column minimal indices (ISI article)

Cs. Szántó, I. Szöllősi, Linear Algebra and its Applications, Volume 517, 2017, Pages 99-119, ISSN 0024-3795

[2015]
Hall polynomials and the Gabriel–Roiter submodules of simple homogeneous modules (ISI article)

Cs. Szántó, I. Szöllősi, Bulletin of the London Mathematical Society, Volume 47, Issue 2, 2015, Pages 206-216, ISSN 0024-6093

[2014]
Computing the extensions of preinjective and preprojective Kronecker modules (ISI article)

I. Szöllősi, Journal of Algebra, Volume 408, 2014, Pages 205-221, ISSN 0021-8693

[2014]
The extension monoid product of preinjective and preprojective Kronecker modules (ISI article)

I. Szöllősi, Acta Scientiarum Mathematicarum, Volume 80, Issue 3, 2014, Pages 419-432, ISSN 0001-6969

[2014]
On the combinatorics of extensions of preinjective Kronecker modules (ISI article)

I. Szöllősi, Acta Universitatis Sapientiae, Mathematica, Volume 6, Issue 1, 2014, Pages 92-106, ISSN 1844-6094

[2014]
An Introduction to Linear Algebra (book, undergraduate course)

C. Pintea, I. Szöllősi, Cluj University Press, 2014, ISBN: 978-973-595-212-9

[2013]
The extension monoid product of preinjective Kronecker modules (BDI article)

I. Szöllősi, Mathematica (Cluj), Volume 55, Issue 78, 2013, Pages 75-88, ISSN 1222-9016

[2012]
On preprojective short exact sequences in the Kronecker case (ISI article)

Cs. Szántó, I. Szöllősi, Journal of Pure and Applied Algebra, Volume 216, Issue 5, 2012, Pages 1171-1177, ISSN 0022-4049

[2011]
The terms in the Ringel-Hall product of preinjective Kronecker modules (ISI article)

Cs. Szántó, I. Szöllősi, Periodica Mathematica Hungarica, Volume 63, Issue 2, 2011, Pages 227-244, ISSN 1588-2829

[2010]
Kriptográfia (book, undergraduate course)

Cs. Szántó, I. Șuteu Szöllősi, Cluj University Press, 2010, ISBN: 978-973-610-973-7

[2009]
Combining the Solitaire Encryption Algorithm with lagged Fibonacci pseudorandom number generators (BDI article)

C. Săcărea, Cs. Szántó, I. Șuteu Szöllősi, Mathematica (Cluj), Volume 51, Issue 74, 2009, Pages 163-171, ISSN 1222-9016

[2007]
Subgroup lattice algorithms related to extending and lifting abelian groups (ISI article)

S. Crivei, Ș. Șuteu Szöllősi, International Electronic Journal of Algebra, Volume 2, 2007, Pages 54-70, ISSN 1306-6048

PROJECTS

[18/11/2020 – 17/02/2022]

Tame algebras via theoretic, combinatorial and computational methods (Grant GTC Nr. 35281/18.11.2020)

- Status: director
- Source of funding: Babeș-Bolyai University grant
- Volume of funding: 50.000 RON
- Main publications or patents:
  - Cs. Szántó, **I. Szöllősi**, *On some Hall polynomials over a quiver of type D4~*, Acta Universitatis Sapientiae, Mathematica, Volume 12, Issue 2, 2020, Pages 395-404, ISSN 1844-6094, https://doi.org/10.2478/ausm-2020-0028
  - Sz. Lénárt, Á. Lőrinczi, Cs. Szántó, **I. Szöllősi**, *Proof of the tree module property for exceptional representations of tame quivers*, arXiv, 2021, https://doi.org/10.48550/arXiv.2001.00016
  - Sz. Lénárt, Á. Lőrinczi, Cs. Szántó, **I. Szöllősi**, *Tree representations of the quiver Dm~*, Colloquium Mathematicum, Volume 167, 2022, Pages 261-302, ISSN 0010-1354, https://doi.org/10.4064/cm8270-11-2020
  - Cs. Szántó, **I. Szöllősi**, *Ringel–Hall polynomials associated to a quiver of type D4~*, Periodica Mathematica Hungarica, Volume 88, Issue 1, 2024, Pages 218-242, ISSN 1588-2829, https://doi.org/10.1007/s10998-023-00549-y

[01/03/2013 – 30/06/2018]

Regularity and Irregularity in Combinatorics and Number Theory (PE1, ERC-2012-ADG_20120216, ID: 321104)

- Status: member
- Source of funding: European grant
- Volume of funding: 1.776.000 EUR
- Main publications or patents:
  - Cs. Szántó, **I. Szöllősi**, *A short solution to the subpencil problem involving only column minimal indices*, Linear Algebra and its Applications, Volume 517, 2017, Pages 99-119, ISSN 0024-3795, https://doi.org/10.1016/j.laa.2016.12.002
  - K. Cziszter, M. Domokos, **I. Szöllősi**, *The Noether numbers and the Davenport constants of the groups of order less than 32*, Journal of Algebra, Volume 510, 2018, Pages 513-541, ISSN 0021-8693, https://doi.org/10.1016/j.jalgebra.2018.02.040
  - Sz. Lénárt, Á. Lőrinczi, **I. Szöllősi**, *Tree representations of the quiver E6~*, Colloquium Mathematicum, Volume 164, 2021, Pages 221-250, ISSN 0010-1354, https://doi.org/10.4064/cm7931-1-2020

[04/2016 – 04/2017]

Combinatorial and computational methods in the representation theory of algebras (Grant GTC-3181)

- Status: director
- Source of funding: Babeș-Bolyai University grant
- Volume of funding: 20.000 RON
- Main publications or patents:
  - Cs. Szántó, **I. Szöllősi**, *A short solution to the subpencil problem involving only column minimal indices*, Linear Algebra and its Applications, Volume 517, 2017, Pages 99-119, ISSN 0024-3795, https://doi.org/10.1016/j.laa.2016.12.002
  - K. Cziszter, M. Domokos, **I. Szöllősi**, *The Noether numbers and the Davenport constants of the groups of order less than 32*, Journal of Algebra, Volume 510, 2018, Pages 513-541, ISSN 0021-8693, https://doi.org/10.1016/j.jalgebra.2018.02.040

[28/07/2010 – 27/07/2013]

Group Algebras and Ringel-Hall Algebras (Grant PN-II-RU-TE-2009, project ID_303)

- Status: member
- Source of funding: national grant
- Volume of funding: 495.000 RON
- Main publications or patents:
  - Cs. Szántó, **I. Szöllősi**, *On preprojective short exact sequences in the Kronecker case*, Journal of Pure and Applied Algebra, Volume 216, Issue 5, 2012, Pages 1171-1177, ISSN 0022-4049, https://doi.org/10.1016/j.jpaa.2011.10.011
  - **I. Szöllősi**, *Computing the extensions of preinjective and preprojective Kronecker modules*, Journal of Algebra, Volume 408, 2014, Pages 205-221, ISSN 0021-8693, https://doi.org/10.1016/j.jalgebra.2013.09.003
  - **I. Szöllősi**, *The extension monoid product of preinjective and preprojective Kronecker modules*, Acta Scientiarum Mathematicarum, Volume 80, Issue 3, 2014, Pages 419-432, ISSN 0001-6969, https://doi.org/10.14232/actasm-012-315-9
  - Cs. Szántó, **I. Szöllősi**, *Hall polynomials and the Gabriel–Roiter submodules of simple homogeneous modules*, Bulletin of the London Mathematical Society, Volume 47, Issue 2, 2015, Pages 206-216, ISSN 0024-6093, https://doi.org/10.1112/blms/bdu109

[01/2009 – 12/2011]

Locally finitely presented categories, submodule categories and applications (Grant PN2-IDEI-PCE-2008-2 ID_2271)

- Status: member
- Source of funding: national grant
- Volume of funding: 281.141 RON
- Main publications or patents:
  - Cs. Szántó, **I. Szöllősi**, *The terms in the Ringel-Hall product of preinjective Kronecker modules*, Periodica Mathematica Hungarica, Volume 63, Issue 2, 2011, Pages 227-244, ISSN 1588-2829, https://doi.org/10.1007/s10998-011-8227-5
  - **I. Szöllősi**, *Computing the extensions of preinjective and preprojective Kronecker modules*, Journal of Algebra, Volume 408, 2014, Pages 205-221, ISSN 0021-8693, https://doi.org/10.1016/j.jalgebra.2013.09.003

[2006]

Special classes of modules and implementations in the GAP system (Grant CNCSIS – AT 72/2006)

- Status: member
- Source of funding: national grant
- Volume of funding: 20.000 RON
- Main publications or patents:
  - S. Crivei, **Ș. Șuteu Szöllősi**, *Subgroup lattice algorithms related to extending and lifting abelian groups*, International Electronic Journal of Algebra, Volume 2, 2007, Pages 54-70, ISSN 1306-6048, http://ieja.net/files/papers/volume-2/Volume-1--2007/4-V2-2007.pdf
  - S. Crivei, G. Olteanu, **Ș. Șuteu Szöllősi**, ELISA. A collection of GAP algorithms related to extending and lifting abelian groups, 2006, http://math.ubbcluj.ro/~crivei/GAP_project

[01/07/2025 – Current]

Silting objects and approximations

- Status: member
- Source of funding: national grant
- Volume of funding: 1.147.368,00 RON

INVITED TALKS

Talks

- **I. Szöllősi**, *Combinatorics of Kronecker modules with applications to the matrix subpencil problem*, Institut für Algebra und Zahlentheorie, Universität Stuttgart, Oct 22, 2013.
- **I. Szöllősi**, *The matrix subpencil problem via Kronecker modules*, Matrix Theory and beyond, Universidade de Lisboa, Lisabona, Dec 14, 2018.
- **I. Szöllősi**, *Computer assisted proof of the tree module property for exceptional tame representations*, Institut für Algebra und Zahlentheorie, Universität Stuttgart, Apr 30, 2024.

CONFERENCES & SEMINARS

Talks

- Cs. L. Ferencz, **I. Szöllősi**, *Break the unbreakable: polynomial-time probabilistic algorithms for prime factorization on a quantum computer*, Proc. of the 4th Transylvanian Students Scientific Conference, Cluj-Napoca, 2001.
- **I. Szöllősi**, *A graphical user interface for the GAP system*, Proc. of the 10th Transylvanian Students Scientific Conference, Cluj-Napoca, 2007.
- **I. Szöllősi**, *Subgroup lattice algorithms related to extending and lifting abelian groups*, 3rd Algebra Symposium, Babes-Bolyai University Cluj-Napoca, May 15-16, 2009.
- **I. Szöllősi**, *On the Hall product of preinjective Kronecker modules*, CSM - The First Conference of PhD Students in Mathematics, Szeged, Hungary, June 29 - July 2, 2010.
- **I. Szöllősi**, *Kronecker modules and matrix pencils*, 13th Postgraduate Group Theory Conference, University of Aberdeen, Aberdeen, Scotland, June 23-25, 2011.
- Cs. Szántó, **I. Szöllősi**, *Short exact sequences of Kronecker modules* (poster), New developments in noncommutative algebra and its applications (Workshop), Sabhal Mòr Ostaig, Isle of Skye, Scotland, Jun 26 - Jul 2, 2011.
- **I. Szöllősi**, *Computing the extensions of preinjective and preprojective Kronecker modules*, Groups and Semigroups: Interactions and Computations (Conference), University of Lisbon, Lisbon, Portugal, July 25-29, 2011.
- **I. Szöllősi**, *Computational methods in the theory of Kronecker modules*, A^3 Abstract Algebra and Algorithms Conference, Eszterházy Károly College, Eger, Hungary, August 14-17, 2011.
- **I. Szöllősi**, *On short exact sequences of Kronecker modules*, Algebraic Representation Theory, Uppsala University, Uppsala, Sweden, September 1-3, 2011.
- **I. Szöllősi**, *On the Hall product of preinjective Kronecker modules*, CSM2 - The Second Conference of PhD Students in Mathematics, Szeged, Hungary, June 28-30, 2012.
- **I. Szöllősi**, *On the extension monoid product of Kronecker modules*, 4th Algebra Symposium, Babes-Bolyai University Cluj-Napoca, April 19-20, 2013.
- **I. Szöllősi**, *The matrix subpencil problem via Kronecker algebras*, Rings, Categories and Hopf Algebras, University of Bucharest, May 18-19, 2013.
- **I. Szöllősi**, *Kronecker-modulusok kombinatorikája és alkalmazások*, A Magyar Tudomány Napja Erdélyben, 4. Matematika és Informatika Alkalmazásokkal Konferencia, 2013. november 8-10.
- **I. Szöllősi**, *Hall-polinomok kiszámítása párhuzamos algoritmusok segítségével*, A Magyar Tudomány Napja Erdélyben, 5. Matematika és Informatika Alkalmazásokkal Konferencia, 2014. november 14-16.
- **I. Szöllősi**, *Computer assisted proof of the tree module property for representations of Euclidean quivers*, 7th International Conference on Mathematics and Informatics, Târgu Mureş/Marosvásárhely, Romania, Sept 2-4, 2019.
- **I. Szöllősi**, *Computer assisted proof of the tree module property, using GAP and Clean*, GAP Days Summer 2025, Koper, Slovenia, 25-29 August 2025.

HONOURS AND AWARDS

[07/11/2024] Employers' Association of the Software and Services Industry
ANIS Education Grant Granted for the introduction and update of the *Introduction to Cryptography* course in the 2024-2025 academic year.

Link: https://www.cs.ubbcluj.ro/oktatoink-rangos-szakmai-elismerest-kaptak-az-anis-romania-altal-meghirdetett-osztondijprogramban/

[28/09/2015] Babeş-Bolyai University, Faculty of Mathematics and Computer Science
Award for teaching excellence Awarded for outstanding activity carried out in the 2014-2015 academic year.

Link: https://www.cs.ubbcluj.ro/premiile-facultatii-de-matematica-si-informatica-pe-anul-2015/

SKILLS

Advanced programming skills in: C/C++, Java, Python / Advanced programming skills in: Haskell, Clean, Prolog / SQL Database Management / Server Administrator / Web Programming / Office Suite / Computing security / LaTeX / InkScape / Graphic design / Operating Systems

DRIVING LICENCE

Driving Licence: AM

Driving Licence: B1

Driving Licence: B

OTHER

Other skills

- music (amateur violin and piano player)

ORGANISATIONAL SKILLS

Experience in organisation of scientific events

- between 2001 and 2007 I was among the organisers of different editions of TSSC (Transylvanian Students' Scientific Conference), http://www.kmdsz.ro/etdk
- 2008 - member of the organising committee of the "International Conference on Modules and Representation Theory, Babeş-Bolyai University, Cluj-Napoca", http://www.math.ubbcluj.ro/~aga_team/AlgebraConferenceCluj2008.html
- 2009 - member of the organising committee of the 3rd Algebra Symposium, Babeş-Bolyai University, Cluj-Napoca, http://www.math.ubbcluj.ro/~aga_team/symposium/AlgebraSymposium2009.html
- 2013 - member of the organising committee of the "DSL2013 - Summer School on Domain Specific Languages", Babeş-Bolyai University, Cluj-Napoca, http://dsl2013.math.ubbcluj.ro (author of the application for Erasmus IP funds, responsable with project management, accounting and web page development)

COMMUNICATION AND INTERPERSONAL SKILLS

Skills

- team spirit
- good communication
- talent for languages