**UNIVERSITATEA "SAPIENTIA" DIN CLUJ-NAPOCA**
**FACULTATEA DE** Facultatea de Ştiinţe Tehnice şi Umaniste din Tîrgu Mureş
**DEPARTAMENTUL** Matematică-Informatică
Concurs pentru ocuparea postului de **CONFERENŢIAR**, poz. **5**
Domeniul de ştiinţă INFORMATICĂ
Disciplinele postului scos la concurs:

PROGRAMAREA CALCULATOARELOR II
ALGORITMICA GRAFURILOR/TEORIA GRAFURILOR

**FIŞA DE VERIFICARE**
a îndeplinirii standardelor universităţii de prezentare la concurs pentru postul de
**conferenţiar universitar**

Candidat: **KÁTAI ZOLTÁN** Data naşterii: **13 martie 1968**.

Funcţia actuală: **Lector universitar**, Data numirii în funcţia actuală: **2004**, Instituţia: **Universitatea "SAPIENTIA" din Cluj-Napoca**

*1. Studiile universitare*

| Nr. crt. | Instituţia de învăţământ superior şi facultatea absolvită | Domeniul | Perioada | Titlul acordat |
|---|---|---|---|---|
| 1 | UNIVERSITATEA TEHNICĂ, Cluj-Napoca | AUTOMATIZĂRI şi CALCULATOARE | 1987-1992 | Inginer, profilul electric, specializarea automatizări |

*2. Studiile de doctorat*

| Nr. crt. | Instituţia organizatoare de doctorat | Domeniul | Perioada | Titlul ştiinţific acordat |
|---|---|---|---|---|
| 1 | UNIVERSITATEA din DEBREŢIN, UNGARIA | MATEMATICĂ-INFORMATICĂ; echivalat în INFORMATICĂ | 2003-2007 | PhD în MATEMATICĂ-INFORMATICĂ echivalat ca DOCTOR în INFORMATICĂ |

*3. Studii şi burse postdoctorale (stagii de cel puţin 6 luni)*

| Nr. crt. | Ţara / Unitatea | Domeniul / Specializarea | Perioada | Tipul de bursă |
|---|---|---|---|---|
| | | | | |

*4. Grade didactice/profesionale anterioare*

| Nr. crt. | Instituţia | Domeniul | Perioada | Titlul/postul didactic sau gradul/postul profesional |
|---|---|---|---|---|
| 1 | LICEUL TEORETIC BOLYAI FARKAS Tg-Mureş | INFORMATICĂ | 1992-1996 | Profesor de informatică |
| 2 | LICEUL TEORETIC BOLYAI FARKAS Tg-Mureş | INFORMATICĂ | 1996-2001 | DEFINITIVAT (în învăţământul preuniversitar) |

| | | | | |
|---|---|---|---|---|
| 3 | LICEUL TEORETIC BOLYAI FARKAS Tg-Mureş | INFORMATICĂ | 2001-2003 | GRADUL II (în învățământul preuniversitar) |
| 4 | UNIVERSITATEA "SAPIENTIA" CLUJ-NAPOCA | INFORMATICĂ | 2003-2004 | ASISTENT universitar |
| 5 | UNIVERSITATEA "SAPIENTIA" CLUJ-NAPOCA | INFORMATICĂ | 2004-2014 | LECTOR universitar |

*5. Gradul de îndeplinire a indicatorilor* [1]

| Criteriu | Indicator minim | Realizat |
|---|---|---|
| Etica cercetării (perspectiva a) | Respectarea normelor de etică a cercetării | DA |
| Producția științifică (perspectiva b) | **Indicatorului P** minim **32** puncte (din care **16** puncte din lucrări de cel puțin categoia B) | DA [52(44)](1) |
| Impactul rezultatelor (perspectiva c) | **Indicatorului C** minim **48** puncte (din care **12** puncte din forumuri de minim tip B) | DA [65(32)] (2) |
| Performanța academică (perspectiva d) | Minim **36** puncte | DA [40.7] (3) |

Pentru (1), (2), (3) vezi justificarea atasată.

**Candidat,**

**KÁTAI ZOLTÁN**

[1] În conformitate cu standardele minimale stabilite în anexele OM 6560/2012 pentru domeniul de știință al postului

# JUSTIFICARE

(http://informatica-universitaria.ro)
(MONITORUL OFICIAL AL ROMÂNIEI, PARTEA I, Nr. 890 bis/27.XII.2012)

(1) **(Perspectiva b)** Formula pentru indicatorul P este: $P = \sum_{i}^{N} \frac{S_i}{\max(1, n-2)}$

Numărul publicațiilor de tip A, B şi C este N=11. Pentru toate cele 11 publicații valoarea max(1,n-2) este 1 (la 9 publicații sun unic autor, la o publicație am 1 coauthor, la o publicație am 2 coautori).

**Am 4 publicații (paper) de categoria A valorând: 4x8=32 puncte.**

**Kátai, Z.**, Juhász, K., Adorjáni, A., K., On the role of senses in education, *Computers & Education*, 51, 2008, 4, 1707–1717. ($IF_{2008} = 2,19$)

| | | | |
|---|---|---|---|
| 03601315 | | Computers and Education | A |

**Kátai, Z.**, The challenge of promoting algorithmic thinking of both sciences and humanities oriented learners, *Journal of Computer Assisted Learning*, 2014. (doi>10.1111/jcal.12070) ($IF_{2014} = 1,632$)

| | | | |
|---|---|---|---|
| 02664909 | 13652729 | Journal of Computer Assisted Learning | A |

**Kátai, Z.**, Intercultural Computer Science Education, *Proceedings of the 2014 conference on Innovation & technology in computer science education*, ACM New York, NY, USA, 2014, 183–188. (doi>10.1145/2591708.2591744)

| | | | | | |
|---|---|---|---|---|---|
| Annual Conference on Innovation and Technology in Computer Science Education | ITiCSE | CORE2013 | A | No | 899 |

**Kátai, Z.**, Selective Hiding for Improved Algorithmic Visualization, *Proceedings of the 2014 conference on Innovation & technology in computer science education*, ACM New York, NY, USA, 2014, 33–38. (doi>10.1145/2591708.2591734)

| | | | | | |
|---|---|---|---|---|---|
| Annual Conference on Innovation and Technology in Computer Science Education | ITiCSE | CORE2013 | A | No | 899 |

**Am 2 publicații (poster) de categoria A valorând: 2x8/2=8 puncte.**

**Kátai, Z.**, ALGO-RYTHMICS: science and art without ethnic borders, *Proceedings of the 2014 conference on Innovation & technology in computer science education*, ACM New York, NY, USA, 2014, 329–329. (doi>10.1145/2591708.2602684)

| | | | | | |
|---|---|---|---|---|---|
| Annual Conference on Innovation and Technology in Computer Science Education | ITiCSE | CORE2013 | A | No | 899 |

**Kátai, Z.**, Algorithmic Thinking for ALL: a motivational perspective, *Proceedings of the 2014 conference on Innovation & technology in computer science education*, ACM New York, NY, USA, 2014, 353–353. (doi>10.1145/2591708.2602669)

| | | | | | |
|---|---|---|---|---|---|
| Annual Conference on Innovation and Technology in Computer Science Education | ITiCSE | CORE2013 | A | No | 899 |

**Am 1 publicații (paper) de categoria B valorând: 1x4=4 puncte.**

**Kátai, Z.**, Toth, L.,Technologically and artistically enhanced multi-sensory computer programming education, *Teaching and teacher education,* 26, 2010, 2, 244–251. ($IF_{2010}$ = 1,124)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **B** | NA | Teaching and Teacher Education | 0742051X | 1985-ongoing | Active | 1.378 | NA | Social Sciences |

**Am 4 publicații (paper) de categoria C valorând: 4x2=8 puncte.**

**Kátai, Z.**, Dynamic programming strategies on the decision tree hidden behind the optimising problems, *Informatics in Education*, 6, 2007, 1, 115–138.

| | | | |
|---|---|---|---|
| 16485831 | | Informatics in Education | C |

**Kátai, Z.**, Multi-sensory method for teaching-learning recursion, *Computer Applications in Engineering Education*, 19, 2011, 2, 234–243. ($IF_{2011}$ = 0,333)

| | | | |
|---|---|---|---|
| 10613773 | 10990542 | Computer Applications in Engineering Education | C |

**Kátai, Z.**, Solving Markov Decision Processes by d-Graph Algorithms, *Control and Cybernetics*, 41, 2012, 3, 577–593.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **C** | NA | Control and Cybernetics | 03248569 | 1996-ongoing | Active | 0.254 | NA | Mathematics |

**Kátai, Z.**, Mutisensori Informatics Education, *Informatics in Education*, 13, 2014, 2. (in press)

| | | | |
|---|---|---|---|
| 16485831 | | Informatics in Education | C |

## TOTAL: 52 puncte (44 categoria A și B)

Factorul impact total pe autor (Katai Zoltan): 2.19/3 + 1.632 + 1.124/2 + 0.333 = 3.257

(2) **(Perspectiva c)** Formula pentru indicatorul C este: $$C = \sum_{i=1}^{N} \frac{\sum_{j=1}^{N_i} S_j^i}{\max(1, n_i - 2)}$$

Numărul lucrărilor citate în publicații de categoriile A, B, C, D este N=7. Pentru toate cele 11 publicații valoarea max(1,n-2) este 1.

1. [2A+3C+11D = 2*8+3*2+11*1 = 16(A) + 6(C) + 11(D) = **33 puncte**]

   **Kátai, Z.**, Juhász, K., Adorjáni, A., K., On the role of senses in education, *Computers & Education*, 51, 2008, 4, 1707–1717.

   a) [A] (ISI, Scopus) E..N.Wiebe, J. Minogue, M.G. Jones, J. Cowley, D. Krebs. (2009). Haptic feedback and students learning about levers: Unravelling the effect of simulated touch. *Computers & Education*, 53, 667-676. doi:10.1016/j.compedu.2009.04.004 (impact factor: 2.19)
   b) [A] (ISI, IEEE) OL Oliveira, AM Monteiro. (2013). Can natural language be utilized in the learning of programming fundamentals? In Proceedings of *43rd Frontiers in Education*, 23-26 October, Oklahoma, USA.
   c) [C] (Scopus) Chiazzese G. & Laganà M. R. (2011). Online learning with virtual puppetry, *Journal of E-Learning and Knowledge Society,* 7 (3), pp. 121-129.
   d) [C] (Scopus) Kalyvioti, K., Mikropoulos, T.A. (2013). A virtual reality test for the identification of memory strengths of dyslexic students in higher education. Journal of Universal Computer Science.

e) [C] (ISI, Scopus) Saeeda Naz, Syed Hamad Shirazi, Tassawar Iqbal, Danish Irfan, Muhammad Junaid and Yusra Naseer. (2014) . Learning Programming through Multimedia and Dry-Run. *Research Journal of Applied Sciences, Engineering and Technology*, 7(21): 4455-4463, ISSN:2040-7459; e-ISSN: 2040-7467.

f) [D] (EBSCO) Fariba Haghan & Kourosh Shariatpanahi. (2011). Influence of Stretching and Deep Breathing Exercises on Test Achievement Scores of Medical Students in Isfahan Medical University, Iran. *Iranian Journal of Medical Education (IJME).* 11 (1), 40-47.

g) [D] (Scopus) Korkmaz, O. (2013). Students' difficulties in and opinions about designing algorithms according to different instructional applications, *Energy Education Science and Technology Part B: Social and Educational Studies,* 5 (1), pp. 209-218.

h) [D] (EBSCO, ERIC) Ö Korkmaz, H Altun. (2013). A validity and reliability study of the Attitude Scale of Computer Programming Learning (ASCOPL), *Mevlana International Journal of Education, 4*(1), pp. 30-43, (mije.mevlana.edu.tr) (http://dx.doi.org/10.13054/mije.13.73.4.1)

i) [D] (ACM DL) C Marinagi, C Skourlas. (2013). Blended Learning in Personalized Assistive Learning Environments, *International Journal of Mobile and Blended Learning, 5*(2), 39-59.

j) [D] (ASOS) Ö Korkmaz. (2013). Engineering And Ceit Student's Attitude Towards Learning Computer Programming, *The Journal of Academic Social Science Studies, 6*(2), 1169-1185.

k) [D] (editlib.org) Abreu-Ellis, C. & Ellis, J. (2008). Universal Design, Information Resources, Technology, and E-learning. In G. Richards (Ed.), *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2008* (pp. 2410-2417). Chesapeake, VA: AACE.

l) [D] (ashland.academia.edu) Abreu-Ellis, C. & Ellis, J. (2009). Principles of universal design in the classroom: a guideline for communication, teaching, and learning. *Linhas*, 10(2), 127 – 143.

m) [D] (Scopus) Bey, A. B. & Tahar Bensalem, H. (2010). Assessment of algorithmic skills in learning environment. *Education Technology and Computer (ICETC),* 3, 213-216.

n) [D] (Scopus) A. Bey, T. Bensebaa, H. Benselem. (2010). EASEL: Evaluation of Algorithmic Skills in an Environment Learning. *World Academy of Science, Engineering and Technology,* 66, 64-67.

o) [D] (Scopus) Brereton, A.E. (2010). Is teaching sign language in early childhood classrooms feasible for busy teachers and beneficial for children? *YC Young Children.* 65 (4), pp. 92-97.

p) [D] (Scopus) Luquini, E. & Omar, N. (2011). Programming plagiarism as a social phenomenon. *2011 IEEE Global Engineering Education Conference, EDUCON 2011* , art. no. 5773251, pp. 895-902.

2. [1A+2C+3D = 1*8+2*2+3*1 = 8(A) + 4(C) + 3(D) = **15 puncte**]

**Kátai Z.**, Toth L., Technologically and artistically enhanced multi-sensory computer programming education, *Teaching and teacher education,* 26, 2010, 2, 244–251.

a) [A] (ACM, ERIC) Tompsett C. (2013). On the Educational Validity of Research in Educational Technology. *Educational Technology & Society, 16*(3), 179–190.

b) [C] (Scopus) Chiazzese G. & Laganà M. R. (2011). Online learning with virtual puppetry, *Journal of E-Learning and Knowledge Society,* 7 (3), pp. 121-129.

c) [C] Renjie LI, Xiaoliang ZHANG. 2013. Research on The Arts Teaching Methods Based on Modern Multimedia Technology. Journal of Convergence Information Technology(JCIT) Volume 8, Number 9, May 2013 doi:10.4156/jcit.vol8.issue9.58.

d) [D] (essie-society.org) Chiazzese G. & Laganà M.R. (2011). Virtual theatrical learning: a new educational perspective of tomorrow. "Towards Systemic Innovation of Education", ESSIE (European Society for the Systemic Innovation of Education) Annual Assembly. 70-74. Leuven, Belgium. ISBN 978-90-817453-0-7.

e) [D] (Scopus) Lin Ying Du, 2013, Experimental Research on Integration Teaching of inside and outside Aerobics Classes Based on Multimedia Technology, *Applied Mechanics and Materials*, Vols. 380-384, pp. 2109-2113.

f) [D] Dean J. Campbell, Joshua P. Peterson , and Tamara J. Fitzjarrald. (2014). Spectroscopy of Sound Transmission in Solid Samples. Journal of Chemical Education. DOI: 10.1021/ed500070j

3. [3C = 3*2 = 6(C) = **6 puncte**]

**Kátai, Z.**, Multi-sensory method for teaching-learning recursion, *Computer Applications in Engineering Education*, 19, 2011, 2, 234–243.

a) [C] (Scopus) Luka Fürst and Viljan Mahnič (2012) A Cooperative Development System for an Interactive Introductory Programming Course. World Transactions on Engineering and Technology Education, 10 (2). pp. 122-127.

b) [C] Rinderknecht, C. (2014). A Survey on Teaching and Learning Recursive Programming. *Informatics in Education,* 13(1).

c) [C] (ISI, Scopus) Saeeda Naz, Syed Hamad Shirazi, Tassawar Iqbal, Danish Irfan, Muhammad Junaid and Yusra Naseer. (2014) . Learning Programming through Multimedia and Dry-Run. *Research Journal of Applied Sciences, Engineering and Technology*, 7(21): 4455-4463, ISSN:2040-7459; e-ISSN: 2040-7467.

4. [1B = 1*4 = 4(B) = **4 puncte**]

   **Kátai, Z.**, Csíki, Á., Automated dynamic programming, *Acta Universitatis Sapientiae, Informatica*, 1, 2009, 2, 149–164.

   a) [B] Sniedovich, M. (2011) *Dynamic Programming: Foundations and Principles, Second Edition,* Taylor & Francis.

5. [1D = 1*1 = 1(D) = **1 puncte**]

   Kása, Z., **Kátai Z.**, Scattered subwords and compositions of integers, *Acta Universitatis Sapientiae, Informatica*, 4, 2012, 2, 225–236.

   a) [D] (Mathematical Reviews, Zentralblatt für Mathematik) Antal Ivanyi, Zoltan Kasa, Prism complexity of matrices, *Annales Univ. Sci. Budapest., Sect. Comp. 39* (2013) 181-202.

6. [1B = 1*4 = 4(B) = **4 puncte**]

   **Kátai, Z.**, "Upperview" algorithm design in teaching computer science in high schools, *Teaching Mathematics and Computer Science*, 3, 2005, 2, 221–241.

   a) [B] (citeseerx.ist.psu.edu) P. Szlavi, L. Zsako, Programming versus Application, *Lecture Notes in Computer Science*, Springer Berlin / Heidelberg, Volume 4226/2006, 48-58, ISSN 0302-9743 (Print) 1611-3349 (Online)

7. [1C = 1*2 = 2(C) = **2 puncte**]

   **Kátai Zoltán**, *Algoritmusok felülnézetből (Algoritmi – o privire de ansamblu)*, Editura Scientia, Cluj-Napoca, 2007.

   a) [C] Márton Gyöngyver, *Introduction in cryptography (Kriptográfiai alapismeretek)*, Scientia, Cluj-Napoca, 2008, ISBN 978-973-1970-00-4.

**TOTAL: 65 puncte (32 categoria A şi B)**

## (3) (Perspectiva d)

**CĂRŢI publicate** în străinătate / publicate în ţară, la edituri recunoscute CNCSIS (nelistate în clasamantul SENSE)

1. **[2 puncte] Kátai Zoltán**, *C: nyelv és programozás (C: limbaj şi programare)*, Universitatea Debreţin, Ungaria, 2008, 270 pagini.
2. **[1 punct]** Nyakóné Juhász Katalin, Terdik György, Biró Piroska, **Kátai Zoltán**, Bevezetés az informatikába (Întroducere în informatică), Universitatea Debreţin, Ungaria, 2011.
3. **[2 puncte] Kátai Zoltán**, *Programozás C nyelven (Programare în limbajul C)*, Editura Scientia, Cluj-Napoca, 2004, 240 pagini, ISBN 973-7953-27-4.
4. **[2 puncte] Kátai Zoltán**, *Algoritmusok felülnézetből (Algoritmi – o privire de ansamblu)*, Editura Scientia, Cluj-Napoca, 2007, 251 pagini, ISBN 978-973-7953-74-2.
5. **[2 puncte] Kátai Zoltán**, *Gráfelméleti algoritmusok (Algoritmica grafurilor)*, Editura Scientia, Cluj-Napoca, 2008, 248 pagini, ISBN 978-973-7953-95-7.

**SUBTOTAL: 9 puncte**

**GRANTURI de cercetare (<50.000 Euro)**

1. **[2 puncte]** *„Legătura dintre tehnicile de programare şi teoria grafurilor”*,

Institutul de Cercetări al Fundației Sapientia (KPI), 13.098 RON, **director**, 2007-2008.

2. [**2 puncte**] *„Legătura dintre tehnicile de programare și teoria grafurilor"*, Institutul de Cercetări al Fundației Sapientia (KPI), 12.200 RON, **director**, 2008-2009.
3. [**1 punct**] *„Matematică discretă"*, Institutul de Cercetări al Fundației Sapientia (KPI), 12.000 RON, **membru**, 2008-2009.
4. [**1 punct**] *„Matematică discretă"*, Institutul de Cercetări al Fundației Sapientia (KPI), 45.000 RON, **membru**, 2009-2012.
5. [**1 punct**] *„Az anyanyelvű szakképzés helyzete, problémái a tanulás (középiskolások) és tanítás (tanárok) viszonylatában" (Educarea în limba maternă a elevilor din instituții cu profil tehnologic)*, Institutul de Cercetări al Fundației Sapientia (KPI), 7.000 RON, **membru**, 2013-2014.
6. [**1 punct**] TAMOP 4.1.2-08/1/A (Social Revival Operative Programme), Guvernul Ungariei / Uniunea Europeană, 2.570.000 Ft (~37.000 RON), **membru**.
7. [**2 puncte**] „ALGO-RITMICĂ: știință și artă fără frontiere etnice", Guvernul Ungariei (Programului „Szülőföld-alap"), 2.000.000 Ft (~29.000 RON), **director**, 2009-2010.

**SUBTOTAL: 10 puncte**

**INVITED SPEAKER** la Eötvös Loránd University (top 500) [**2 puncte**]

- "Invited speaker" (Modelling dynamic programming problems by d-graphs), Eötvös Loránd University, Faculty of Informatics (Scientific semminar of Departments of Algorithms and their Aplications and Information Systems), 4 aprilie, 2013, Budapesta.

**PROFESOR VISITING** la Eötvös Loránd University (top 500) [**2 puncte**]

- „Profesor visiting" ( programul CEEPUS, 16 ore de predare), Eötvös Loránd University (MsC / PhD), 23-27 septembrie, 2013, Budapesta.

**SUBTOTAL: 4 puncte**

**INSTRUMENTE SOFTWARE**

1. [**2 puncte**] Quick-sort with Hungarian (Küküllőmenti legényes) folk dance.
   https://www.youtube.com/user/AlgoRythmics. 690,264 views.
2. [**2 puncte**] Merge-sort with Transylvanian-saxon (German) folk dance.
   https://www.youtube.com/user/AlgoRythmics. 200,476 views.
3. [**2 puncte**] Shell-sort with Hungarian (Székely) folk dance.
   https://www.youtube.com/user/AlgoRythmics. 306,861 views.
4. [**2 puncte**] Select-sort with Gypsy folk dance.
   https://www.youtube.com/user/AlgoRythmics. 257,398 views.
5. [**2 puncte**] Bubble-sort with Hungarian ("Csángó") folk dance.
   https://www.youtube.com/user/AlgoRythmics. 753,299 views.
6. [**2 puncte**] Insert-sort with Romanian folk dance.
   https://www.youtube.com/user/AlgoRythmics. 293,651 views.

7. [**2 puncte**] Technologically and artistically enhanced inter-cultural computer science education

   http://algo-rythmics.ms.sapientia.ro/

**SUBTOTAL: 14 puncte**

**PREMIU internațional [10% = 3.7 puncte]**

- 2013 Best Practices in Education Award (Informatics Europe) (http://www.informatics-europe.org/services/curriculum-award.html) (**Zoltan Katai**, Laszlo Toth and Alpar Karoly Adorjani: "Multi-Sensory Informatics Education")

## TOTAL: 40.7 puncte

**Candidat,**

**KÁTAI ZOLTÁN**