



Johanna Sápi, PhD



Research field

Biomedical systems, control theory, pathophysiological modeling, system identification, cancer treatment



Professional position

- 2016 – **Senior lecturer**
Obuda University
John von Neumann Faculty of Informatics
Institute of Biomatics
Physiological Controls Research Center
- 2015 – 2016 **Assistant lecturer**
Obuda University
John von Neumann Faculty of Informatics
Institute of Biomatics
Physiological Controls Group
- 2013 – 2015 **PhD student**
Obuda University
John von Neumann Faculty of Informatics
Institute of Applied Informatics
Physiological Controls Group
- 2012 – 2013 **PhD student**
Budapest University of Technology and Economics
Faculty of Electrical Engineering and Informatics
Department of Control Engineering and Information Technology
Laboratory of Biomedical Engineering



Education

- 2016
Semmelweis University's Institutional Animal Care and Use Committee
Experimental animals – animal experiments course level "B"
The course gives permission to carry out animal experiments and design projects
- 2013 – 2015
Obuda University
Doctoral School of Applied Informatics and Applied Mathematics (PhD)
PhD in Applied Informatics (Summa cum laude)
Research topic: *Model-based control of cancer diseases*
Thesis: *Controller-managed automated therapy and tumor growth model identification in the case of antiangiogenic therapy for most effective, individualized treatment*
Supervisor: Levente Kovács PhD, habil
- 2012 – 2013
Budapest University of Technology and Economics
Doctoral Schools at Faculty of Electrical Engineering and Informatics
PhD in Electrical Engineering
Research topic: *Model-based control of cancer diseases*
Supervisor: Levente Kovács PhD



Place of birth

Budapest, Hungary



Date of birth

January 07, 1986



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H-1034 Budapest,
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2010 – 2012	<p>Budapest University of Technology and Economics Faculty of Electrical Engineering and Informatics MSc in Biomedical Engineering (Summa cum laude) Thesis: <i>Optimal control algorithms for antiangiogenic therapy based tumor treatment</i> Supervisors: Levente Kovács PhD, István Harmati PhD, Dániel András Drexler, Prof. Zoltán Sági MD PhD</p>
2006 – 2010	<p>Semmelweis University Faculty of Medicine BSc in Health care management Thesis: <i>Interactive, personalized health education and therapy support via Internet for patients with metabolic syndrome</i> Supervisor: Zoltán Sára</p>
1998 – 2004	<p>St. Stephens Secondary School, Budapest Class of Natural Sciences High school diploma</p>



Languages

Hungarian:	native
English:	intermediate
Russian:	basic



Professional results

2009	<p>III. place in Students' Scientific Association (TDK) conference Semmelweis University Paper: <i>Metabolic Syndrome – the endemic</i> Supervisor: Péter Csépe MD PhD Semmelweis University, Faculty of Medicine, Department of Public Health</p>
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Supervisor activities

- Budapest University of Technology and Economics, Faculty of Electrical Engineering and Informatics, Biomedical Engineering MSc thesis (1)
- Obuda University, John von Neumann Faculty of Informatics, Computer Science and Engineering BSc thesis (2)
- Obuda University, John von Neumann Faculty of Informatics, Computer Science and Engineering MSc thesis (2)
- Pázmány Péter Catholic University, Faculty of Information Technology and Bionics, Molecular Bionics Engineer BSc thesis (1)
- Obuda University, John von Neumann Faculty of Informatics, Scientific Students' Associations (TDK) (2)



Courses taught

- Biomedical computing practices (BMEVIMIM301), BME-VIK, Biomedical Engineering MSc, in Hungarian
- Control Theory (BMEVIMM158), BME-VIK, Biomedical Engineering MSc, in Hungarian
- Biomedical Engineering (BMEVIII AV09), BME-VIK, Biomedical Engineering MSc, in Hungarian
- Control Theory I. (NIRIT1SAEC), OE-NIK, Computer Science Engineering BSc, in Hungarian
- Control Theory II. (NIRIT2SAEC), OE-NIK, Computer Science Engineering BSc, in Hungarian

- Biomedical Engineering (NIRBE1SVNC) OE-NIK, Computer Science Engineering BSc, in Hungarian
- Basics of Information Systems (NIRIA1SEND), OE-NIK, Computer Science Engineering BSc, in English
- Control Engineering (NIRCE1SERD), OE, Science Without Borders program (for Brazilian students), angol nyelven
- Intelligent Systems (NIRIS1SERD), OE, Science Without Borders program (for Brazilian students), in English
- Control Theory (NIRITOSAED), OE-NIK, Computer Science Engineering BSc, in Hungarian
- Biomedical Engineering (NAIBE1SEND), OE-NIK, Computer Science Engineering BSc, in English
- Systems and control theory (NAIRI1CANM), OE-NIK, Computer Science Engineering MSc, in Hungarian
- Systems and control theory (NAIRI1CENM), OE, Stipendium Hungaricum program, MSc, in English

Reviewer activities

- *Conference:*
 - IFAC (International Federation of Automatic Control)
 - INES (IEEE International Conference on Intelligent Engineering Systems)
 - CINTI (IEEE International Symposium on Computational Intelligence and Informatics)
 - SAMI (IEEE International Symposium on Applied Machine Intelligence and Informatics)
 - SACI (IEEE International Symposium on Applied Computational Intelligence and Informatics)
 - SMC (IEEE International Conference on Systems, Man, and Cybernetics)
 - ICIEA (IEEE Conference on Industrial Electronics and Applications)
- *Journal:* Acta Polytechnica Hungarica
- *Thesis:* Budapest University of Technology and Economics, Faculty of Electrical Engineering and Informatics (MSc); Obuda University, John von Neumann Faculty of Informatics (MSc)
- *Students' Scientific Association Conference (OU), National Students' Scientific Association Conference*
- *New National Excellence Program (ÚNKP) Scholarship for MSc students – reviewer*

Conference organization

- Local Organizing Committee member / Track Chair:
 - SMC 2016 Junior Systems Science & Engineering track chair – IEEE International Conference on Systems, Man, and Cybernetics, Budapest, Hungary
 - SMC 2016 Local Organizing Committee member – IEEE International Conference on Systems, Man, and Cybernetics, Budapest, Hungary
- Technical Program Committee member:
 - SMC 2016 – IEEE International Conference on Systems, Man, and Cybernetics, Budapest, Hungary
 - SAMI 2016 – IEEE International Symposium on Applied Machine Intelligence and Informatics, Herl'any, Slovakia



Research projects involvements

- ERC StG Grant “*Tamed Cancer*” 679681 (2016-2021), researcher
- TÁMOP 4.2.2.D-15/1/KONV-2015-0002 project “*Development of smart technologies for supporting high-tech industrial areas*” (2015), researcher
- National Development Agency, GOP-2011-1.1.1 program, GOP-1.1.1-11-2012-0055 project, “*DIALOGIC – Mathematical model-based decision support system to improve diabetes health management*” (2012-2013), researcher



Professional affiliations and contributions

- John von Neumann Computer Society Biomedical Section board member (2016 –)
- IEEE (Institute of Electrical and Electronics Engineers) member (Membership number: 92621920)
 - IEEE Student member (2013 – 2015)
 - IEEE member (2015 –)
 - IEEE Systems, Man, and Cybernetics (SMC) Society member (2015 –)
 - IEEE SMC Hungary Section Chapter secretary (2016 –)
 - IEEE Young Professionals member (2015 –)
 - IEEE Women in Engineering member (2015 –)
 - IEEE Engineering in Medicine and Biology Society member (2015 –)



Publications

Johanna Sapi’s publications in MTMT:

<https://vm.mtmt.hu//search/slist.php?lang=0&AuthorID=10036432>

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|------|---|
| 2016 | Tamas Ferenci, <u>Johanna Sapi</u> , Levente Kovacs: “Modelling xenograft tumor growth under antiangiogenic inhibition with mixed-effects models”, <i>Proceedings of the 2016 IEEE International Conference on Systems, Man, and Cybernetics</i> . Budapest, Hungary, 2016.10.09-2016.10.12. pp. 3912-3917. |
| 2016 | <u>Johanna Sapi</u> , Daniel Andras Drexler, Levente Kovacs: “Comparison of protocol based cancer therapies and discrete controller based treatments in the case of endostatin administration”, <i>Proceedings of the 2016 IEEE International Conference on Systems, Man, and Cybernetics</i> . Budapest, Hungary, 2016.10.09-2016.10.12. pp. 3830-3835. |
| 2016 | <u>J Sapi</u> , D A Drexler, L Kovacs: “Discrete time state feedback with setpoint control, actual state observer and load estimation for a tumor growth model” In: Szakal Aniko (szerk.) <i>Proceedings of the 11th IEEE International Symposium on Applied Computational Intelligence and Informatics SACI 2016</i> . Timisoara, Romania, 2016.05.12-2016.05.14. Budapest: IEEE, 2016. pp. 111-118. |
| 2016 | <u>Johanna Sapi</u> , Daniel Andras Drexler, Istvan Harmati, Zoltan Sapi, Levente Kovacs: „Qualitative analysis of tumor growth model under antiangiogenic therapy – choosing the effective operating point and design parameters for controller design”, <i>OPTIMAL CONTROL APPLICATIONS AND METHODS</i> , IF: 0.90, 37:(5) pp. 848-866. (2016) |
| 2015 | <u>Johanna Sapi</u> , Levente Kovacs, Daniel Andras Drexler, Pal Kocsis, David Gajari, Zoltan Sapi: “Tumor Volume Estimation |

- and Quasi- Continuous Administration for Most Effective Bevacizumab Therapy”, *PLOS ONE*, 10:(11) Paper e0142190. 20 p.
- 2015 Johanna Sápi, Tamás Ferenci, Dániel András Drexler, Levente Kovács: “Tumor model identification and statistical analysis”, In: Sam Kwong, Daniel Yeung (ed.) *Proceedings of the 2015 IEEE International Conference on Systems, Man, and Cybernetics*. Hong Kong, China, 2015.10.08-2015.10.12. pp. 2481-2486.
- 2015 Sápi Johanna, Drexler Dániel András, Kovács Levente: “Comparison of mathematical tumor growth models”, In: Anikó Szakál (ed.) *Proceedings of the 13th IEEE International Symposium on Intelligent Systems and Informatics*. Subotica, Serbia, 2015.09.17-2015.09.19. Subotica: IEEE Hungary Section, 2015. pp. 323-328.
- 2015 Johanna Sájeviczné Sápi: “Controller-managed automated antiangiogenic cancer therapy”, 160 p. Saarbrücken: LAP Lambert Academic Publishing, 2015. 160 p. (ISBN:978-3-659-74344-3)
- 2015 Johanna Sájeviczné Sápi: “Controller-managed automated therapy and tumor growth model identification in the case of antiangiogenic therapy for most effective, individualized treatment”, 127 p. Óbudai University, Doctoral School: Doctoral School of Applied Informatics and Applied Mathematics. Supervisor: Levente Kovács PhD, habil. PhD thesis, 2015
- 2015 L Kovács, T Ferenci, J Sápi, Gy Eigner, J Klepsitz, P Szalay, M Kozlovsky, I Rudas: “Physiological Modeling and Control at Obuda University”, In: Anikó Szakál (ed.), *SACI 2015 – 10th IEEE International Symposium on Applied Computational Intelligence and Informatics*. Timisoara, Romania, 2015.05.21-2015.05.23. Budapest: Óbudai University, 2015. pp. 21-25.
- 2014 J Sápi, D A Drexler, Z Sápi, L Kovács: “Identification of C38 colon adenocarcinoma growth under bevacizumab therapy and without therapy”, In: Anikó Szakál (ed.), *CINTI 2014 – 15th IEEE International Symposium on Computational Intelligence and Informatics*. Budapest, Hungary, 2014.11.19-2014.11.21. (IEEE Computational Intelligence Society), Budapest: IEEE Hungary Section, 2014. pp. 443-448.
- 2014 L Kovács, J Sápi, Gy Eigner, T Ferenci, P Szalay, J Klepsitz, B Kurtán, M Kozlovsky, D A Drexler, P Pausits, I Harmati, Z Sápi, I Rudas: “Model-based healthcare applications at Obuda University”, In: Anikó Szakál (ed.), *SACI 2014 – 9th IEEE International Symposium on Applied Computational Intelligence and Informatics*. Timisoara, Romania, 2014.05.15-2014.05.17. (IEEE) Timisoara: IEEE Hungary Section, 2014. pp. 183-187. (ISBN:978-1-4799-4694-5)
- 2014 Annamária Szeles, Dániel András Drexler, Johanna Sápi, István Harmati, Levente Kovács, “Model-based Angiogenic Inhibition

- of Tumor Growth using Adaptive Fuzzy Techniques”, *PERIOD POLYTECH ELECTR ENG COMP SCI* 58(1) pp. 29-36. (2014)
- 2014 Levente Kovács, Annamária Szeles, Johanna Sápi, Dániel A Drexler, Imre Rudas, István Harmati, Zoltán Sápi, “Model-based Angiogenic Inhibition of Tumor Growth using Modern Robust Control Method”, *COMPUTER METHODS AND PROGRAMS IN BIOMEDICINE*, IF: 1.555, 114 pp. 98-110. (2014)
- 2014 A Szeles, D A Drexler, J Sápi, I Harmati, L Kovács, “Study of Modern Control Methodologies Applied to Tumor Growth under Angiogenic Inhibition”, In: E Boje, X Xia, *IFAC WC 2014 – 19th World Congress of the International Federation of Automatic Control*. Cape Town, South Africa, 2014.08.24-2014.08.29., Cape Town: Elsevier - IFAC, 2014. pp. 9271-9276.
- 2013 A Szeles, D A Drexler, J Sápi, I Harmati, Z Sápi, L Kovács, “Model-based Angiogenic Inhibition of Tumor Growth using Feedback Linearization”, In: Parisini T, Tempo R (ed.) *CDC 2013 – 52nd IEEE Conference on Decision and Control*, Florence, Italy, 2013.12.10-2013.12.13. (IEEE), Piscataway: IEEE, 2013. pp. 2054-2059. (ISBN:978-1-4673-5716-6)
- 2013 J Sápi, D A Drexler, L Kovács, “Parameter optimization of H_{∞} controller designed for tumor growth in the light of physiological aspects”, In: Anikó Szakál (ed.) *CINTI 2013 – 14th IEEE International Symposium on Computational Intelligence and Informatics*, Budapest, Hungary, 2013.11.19-2013.11.21. Budapest: IEEE Hungary Section, 2013. pp. 19-24. (ISBN:978-1-4799-0194-4)
- 2013 L Kovács, J Sápi, T Ferenci, P Szalay, D Drexler, Gy Eigner, P I Sas, I Harmati, M Kozlovszky, Z Sápi, “Model-based optimal therapy for high-impact diseases”, In: Anikó Szakál (ed.) *INES 2013 – 17th International Conference on Intelligent Engineering Systems*, Costa Rica, 2013.06.19-2013.06.21. (IEEE), Budapest: IEEE Hungary Section, 2013. pp. 209-214.
- 2013 J Sápi, D A Drexler, I Harmati, A Szeles, B Kiss, Z Sápi, L Kovács, “Tumor growth model identification and analysis in case of C38 colon adenocarcinoma and B16 melanoma”, In: Anikó Szakál (ed.) *SACI 2013 – 8th International Symposium on Applied Computational Intelligence and Informatics*, Timisoara, Romania, 2013.05.23-013.05.25. (IEEE), Budapest: IEEE Hungary Section, 2013. pp. 303-308. (ISBN:978-4673-6400-3)
- 2013 B Kiss, J Sápi, L Kovács, “Imaging method for model-based control of tumor diseases”, In: Anikó Szakál (ed.) *SISY 2013 – 11th International Symposium on Intelligent Systems and Informatics*, Subotica, Serbia, 2013.09.26-2013.09.28. Budapest: IEEE Hungary Section, 2013. pp. 271-275. (ISBN:978-1-4799-0303-0)
- 2012 Yi-Che Changchien, Péter Tátrai, Gergő Papp, Johanna Sápi, László Fonyad, Miklós Szendrői, Zsuzsanna Pápai, Zoltán Sápi, “Poorly differentiated synovial sarcoma is associated with high

- expression of enhancer of zeste homologue 2 (EZH2).”, *Journal of Translational Medicine* 10: Paper 216. (2012), IF: 3.474, DOI: 10.1186/1479-5876-10-216
- 2012 D A Drexler, J Sápi, A Szeles, I Harmati, L Kovács, “Comparison of Path Tracking Flat Control and Working Point Linearization Based Set Point Control of Tumor Growth with Angiogenic Inhibition”, *BULETINUL STIINTIFIC AL UNIVERSITATI POLITEHNICA DIN TIMISOARA ROMANIA SERIA AUTOMATICA SI CALCULATORAE = SCIENTIFIC BULLETIN OF POLITEHNICA UNIVERSITY OF TIMISOARA TRANSACTIONS ON AUTOMATIC CONTROL AND COMPUTER SCIENCE* 57 (71):(2) pp. 113-120. (2012)
- 2012 Szeles Annamária, Sápi Johanna, Drexler Dániel, Harmati István, Sápi Zoltán, Kovács Levente, “Model-based Angiogenic Inhibition of Tumor Growth using Modern Robust Control Method.”, In: Balazs Benyo, Andreassen Steen, Feng David Dagan, Carson Ewart, Chase J Geoffrey, Levente Kovács (ed.), *IFAC BMS 2012 – 8th IFAC Symposium on Biological and Medical Systems*, Budapest: IFAC by Pergamon Press, 2012. pp. 113-118. (Biological and Medical Systems; 8.) ISBN: 978-3-902823-10-6
- 2012 Sápi Johanna, Drexler Dániel, Harmati István, Sápi Zoltán, Kovács Levente, “Linear state-feedback control synthesis of tumor growth control in antiangiogenic therapy.”, In: *SAMI 2012 – 10th International Symposium on Applied Machine Intelligence and Informatics*. Herlany, Slovakia, 2012.01.26-2012.01.28. (IEEE) Budapest: Óbuda University, pp. 143-148.(ISBN: 978-1-4577-0197-9)
- 2012 Kovács Levente, Ferenci Tamás, Sápi Johanna, Szalay Péter, “Népegészségügyi problémák számítógépes modellezése.”, *IME-INFORMATIKA ÉS MENEDZSMENT AZ EGÉSZSÉGÜGYBEN* XI:(8) pp. 49-55. Paper 15. (2012)
- 2012 Kovács Levente, Szalay Péter, Ferenci Tamás, Sápi Johanna, Sas Péter István, Drexler Dániel, Harmati István, Benyó Balázs, Kovács Adalbert, “Model-based control algorithms for optimal therapy of high-impact public health diseases.”, In: *INES 2012 – 16th International Conference on Intelligent Engineering Systems*. Lisbon, Portugal, 2012.06.13-2012.06.15. (IEEE)pp. 531-536. Paper 93. (ISBN: 978-1-4673-2695-7), DOI: 10.1109/INES.2012.6249892
- 2012 Drexler Dániel András, Sápi Johanna, Szeles Annamária, Harmati István, Kovács Adalbert, Kovács Levente, “Flat control of tumor growth with angiogenic inhibition.” In: *SACI 2012 – 6th International Symposium on Applied Computational Intelligence and Informatics*. Timisoara, Romania, 2012.05.24-2012.05.26. (IEEE) pp. 179-183.(ISBN: 978-1-4673-1014-7), DOI: 10.1109/SACI.2012.6249998
- 2011 Kovács Levente, Szalay Péter, Ferenci Tamás, Drexler Dániel András, Sápi Johanna, Harmati István, Benyó Zoltán,

“Modeling and Optimal Control Strategies of Diseases with High Public Health Impact.”, In: *INES 2011 – 15th International Conference on Intelligent Engineering System*. Poprad, Slovakia, 2011.06.23-2011.06.25. (IEEE)pp. 23-28.(ISBN: 978-1-4244-8955-8), DOI: 10.1109/INES.2011.5954713

2011

Drexler Dániel András, Kovács Levente, Sápi Johanna, Harmati István, Benyó Zoltán, “Model-based analysis and synthesis of tumor growth under angiogenic inhibition: a case study.”, In: Bittanti, Sergio, Cenedese, Angelo, Zampieri, Sandro (szerk.), *IFAC WC 2011 – 18th World Congress of the International Federation of Automatic Control*. Milano, Italy, 2011.08.29-2011.09.02. (IFAC) Milano: IFAC by Pergamon Press, pp. 3753-3758. Paper 2107. (ISBN: 978-3-902661-93-7), DOI: 10.3182/20110828-6-IT-1002.02107