ROBERT PALOVICS

PERSONAL INFORMATION

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Google Scholar	https://scholar.google.com/citations?user=I1VaRFEAAAAJ
Work Authorization	*Permanent Resident, authorized to work in the US without sponsorship*

PERSONAL STATEMENT

I am a mathematician and computer scientist by training, particularly interested in *machine learning* (ML) and *data science*. My current research investigates *machine learning for biomedical sciences* with a focus on *aging* and *neurodegeneration*. I leverage large-scale biological datasets that describe organisms at the *cellular level* and develop novel computational methods to discover transcriptomic signatures that will serve as the basis for rejuvenation and interventions to prevent or delay age-related diseases.

INTERESTS

data science (DS), *machine learning (ML)*, *artificial intelligence (AI)*, deep learning, biomedical data science, single-cell data science, recommender systems (*recSys*)

TECHNICAL EXPERIENCE

Python, C++, R, OOP, TDD, Anaconda, Jupyter Notebook, Pandas, scikit-learn, PyTorch, TensorFlow, Scanpy, Deseq2, single-cell RNAseq, bulk RNAseq, single-cell perturbations, proteomics, CRISPR screens, network science,Dash, Git, Linux, LaTeX, Markdown

EMPLOYMENT

Stanford University April 2018 - Present
Instructor since April 2023, Postdoctoral Fellow since April 2018 *Stanford, CA, US*

[ML] *Silver medal, 17th/1,097* in the 2023 Single-Cell Perturbations Challenge, part of the *2023 Conference on Neural Information Processing Systems Competition Track*.
[AI] Developing *foundational model* for plasma proteomics
[ML] Tailoring *interpretable neural network ML models* for age and disease estimation from proteomics data
[ML] Developed *subset selection* based ML method to alleviate biases in single-cell data (5)
[DS] Discovered a new *Alzheimer's Disease* signature from single-cell RNAseq data (1)
[DS] Leading data scientist of the *parabiosis single-cell atlas*, a cell level of map of aging and rejuvenation (6)
[DS] Data scientist on the *Tabula Muris Senis aging cell atlas* (11; 12) and other singe-cell studies (2; 3; 4; 7)
[DS] Studied the effect of idiosyncratic shocks in *production networks* during economic crises (9)

Informatics Laboratory of the Hungarian Academy of Sciences August 2012 - March 2018
Graduate Student/Research Assistant *Budapest, Hungary*

[ML] Research projects on *representation learning for recSys* (15; 17; 18; 21; 22; 25; 27; 28; 30; 32; 33)
[ML] Software developed to prototype and benchmark recommender algorithms (22)
[ML] Research projects on *embeddings, centrality, growth in temporal networks* (10; 14; 16; 19)
[ML] Advisor of the ACM International Recommender Systems Challenge 2017
[ML] Organizer of the ACM International Recommender Systems Challenge 2016 (23)
[DS] Organizer of the ECML/PKDD International Data mining Challenge 2016
[DS] Organizer of the Budapest Bike Sharing Data Mining Challenge 2015

Université Paul Sabatier, CNRS Summer 2013
Research Assistant *Toulouse, France*

[ML] Collaboration with the research group of Dima Shepelyansky on location-aware embeddings (26)

ACADEMIC HISTORY

Stanford University April 2023 - Present
Instructor

Department: Neurology
Advisor: Tony Wyss-Coray

Stanford University July 2019 - Present
Postdoctoral Fellow

Department: Neurology
Advisor: Tony Wyss-Coray

Stanford University April 2018 - June 2019
Postdoctoral Fellow

Department: Computer Science
Advisor: Jure Leskovec

Budapest University of Technology and Economics September 2012 - January 2018
Ph.D. in Mathematics and Computer Sciences

Advisor: András Benczúr
Thesis: Revealing Information Networks

Budapest University of Technology and Economics September 2010 - June 2012
M.Sc. in Physics

Advisor: András Benczúr
Thesis: Information Spreading in Social Networks

Budapest University of Technology and Economics September 2007 - June 2010
B.Sc. in Physics

Advisor: János Kertész
Thesis: Scaling telecommunication networks via simulated annealing (Hungarian)

TEACHING AND MENTORING

Stanford University April 2018 - Present
Supervisor *Stanford, CA, US*

Provided guidance and support to numerous undergraduate and graduate students in their research coursework, collaborative projects, and the composition of manuscripts

Aquincum Institute of Technology Spring 2013 - Spring 2017
Data mining (course language: English) *Budapest, Hungary*

Lecturer since Fall 2015
Teaching assistant since Spring 2013

Budapest University of Technology and Economics Fall 2012 - Spring 2013
Programming I & II *Budapest, Hungary*

Teaching assistant

Informatics Laboratory of the Hungarian Academy of Sciences Spring 2013 - Present
Supervisor *Budapest, Hungary*

Mentored and assisted multiple students with their B.Sc. and M.Sc. theses in machine learning, data science, and network science

AWARDS

Silver medal, 17th/1,097 in the 2023 Single-Cell Perturbations Challenge, 2023 Conference on Neural Information Processing Systems Competition Track
2023 Awardee of a AHA-Allen Brain Health and Cognitive Impairment Cross-Network Collaborative Grant
2020-2021 Awardee of the Stanford Aging and Ethnogeriatrics (SAGE) Research Center
Leader of team "Budapest" (24) on the ACM International Recommender Systems Challenge 2015, Prize: 5
Leader of team "BenHuns" (31) on the ACM International Recommender Systems Challenge 2014, Prize: 2

PRESENTATIONS

Meeting of the Gerontological Society of America (GSA), 2023 November 11, 2023, Tampa, FL, USA
Atlas-scale single-cell data science reveal signatures of aging and rejuvenation (6)

International Conference on Machine Learning (ICML) 2022 July 22, 2022, Baltimore, MD, USA
Single-cell transcriptomics data purification with coreset selection (5)

Gordon Research Conference (GRC) Systems Aging Conference 2022, June 2, 2022, Newry, ME, USA
Molecular hallmarks of heterochronic parabiosis at single-cell resolution (6)

ACM Distributed Event-based Systems (DEBS) 2021 June 29, 2021, Online
Tutorial on graph stream analytics (10)

ACM Recommender Systems Conference (RecSys) 2017 August 27, 2017, Como, Italy
Tutorial on Open Source Online Learning Recommenders (18)

ACM International Conference on Web Search and Data Mining 2017 February 7, 2017, Cambridge, UK
Raising Graphs from Randomness to Reveal Information Networks (19)

INRA at the ACM RecSys Recommender Systems Conference 2015 September, 2015, Vienna, Austria
Predicting User-specific Temporal Retweet Count Based on Network and Content Information (28)

ACM Recommender Systems Conference (RecSys) 2014 October, 2014, Foster City, Silicon Valley, USA
Exploiting temporal influence in online recommendation (30)

IEEE/ACM International Conference on Advances in Social Network Analysis and Mining (ASONAM) 2013 August, 2013, Niagara Falls, Canada
Temporal influence over the Last.fm social network (33)

REVIEWING, PROGRAM COMMITTEE MEMBERSHIP

ACM Recommender Systems Conference 2018-Present; *The Web Conf.* 2019, 2021, 2022; *ACM International Conference on Web Search and Data Mining* 2023; *Machine Learning in Computational Biology* 2019, 2020; *ACM Recommender Systems Conference ORSUM Workshop* 2019; *SIAM International Conference on Data Mining* 2023; *International Conference on Machine Learning, Workshop on Computational Biology* 2022; *Data Mining and Knowledge Discovery* (Springer)

PUBLICATIONS

[1] M. S. Haney, **Robert Palovics**, C. Nicole Munson, N. Schaum, T. Wyss-Coray, et al. Apoe 4/4 is linked to damaging lipid droplets in alzheimer's microglia. *equal co-first contribution,* accepted *in Nature*, 2023.

[2] M. S. Haney, A. Shankar, I. Hsu, M. Miyauchi, **Robert Palovics**, H. M. Khoo, K. J. Igarashi, J. Bhadury, C. Munson, P. K. Mack, et al. Large-scale in vivo crispr screens identify saga complex members as a key regulators of hsc lineage commitment and aging. *bioRxiv (under review at Cell)*, 2023.

[3] O. Hahn, A. G. Foltz, M. Atkins, B. Kedir, P. Moran-Losada, I. H. Guldner, C. Munson, F. Kern, **Robert Palovics**, N. Lu, et al. Atlas of the aging mouse brain reveals white matter as vulnerable foci. *Cell*, 2023.

[4] A. C. Yang, R. T. Vest, F. Kern, D. P. Lee, M. Agam, C. A. Maat, P. M. Losada, M. B. Chen, N. Schaum, **Robert Palovics**, et al. A human brain vascular atlas reveals diverse mediators of alzheimer's risk. *Nature*, pages 1–8, 2022.

[5] **Robert Palovics**, B. Mirzasoleiman, and T. Wyss-Coray. Single-cell transcriptomics data purification with coreset selection. In *Proceedings of the 2022 ICML Workshop on Computational Biology*. ICML, 2022.

[6] **Robert Palovics**, A. Keller, N. Schaum, W. Tan, T. Fehlmann, M. Borja, F. Kern, L. Bonanno, K. Calcuttawala, J. Webber, et al. Molecular hallmarks of heterochronic parabiosis at single-cell resolution. *Nature*, pages 1–6, 2022.

[7] T. Iram, F. Kern, A. Kaur, S. Myneni, A. R. Morningstar, H. Shin, M. A. Garcia, L. Yerra, **Robert Palovics**, A. C. Yang, et al. Young csf restores oligodendrogenesis and memory in aged mice via fgf17. *Nature*, 605(7910):509–515, 2022.

[8] O. Hahn, A. G. Foltz, M. Atkins, B. Kedir, P. Moran-Losada, I. H. Guldner, C. Munson, F. Kern, **Robert Palovics**, N. Lu, et al. A spatiotemporal map of the aging mouse brain reveals white matter tracts as vulnerable foci. *bioRxiv (accepted at Cell)*, 2022.

[9] **Robert Palovics**, P. Dolenc, and J. Leskovec. Companies under stress: the impact of shocks on the production network. *EPJ Data Science*, 10(1):57, 2021.

[10] A. Benczur, F. Beres, D. Kelen, and **Robert Palovics**. Tutorial on graph stream analytics. In *Proceedings of the 15th ACM International Conference on Distributed and Event-based Systems*, pages 168–171, 2021.

[11] **Tabula Muris Consortium** et al. A single-cell transcriptomic atlas characterizes ageing tissues in the mouse. *Nature*, 583(7817):590–595, 2020.

[12] N. Schaum, B. Lehallier, O. Hahn, **Robert Palovics**, S. Hosseinzadeh, S. E. Lee, R. Sit, D. P. Lee, P. M. Losada, M. E. Zardeneta, et al. Ageing hallmarks exhibit organ-specific temporal signatures. *Nature*, 583(7817):596–602, 2020.

[13] O. Kapitansky, G. Karmon, S. Sragovich, A. Hadar, M. Shahoha, I. Jaljuli, L. Bikovski, E. Giladi, **Robert Palovics**, T. Iram, et al. Single cell adnp predictive of human muscle disorders: Mouse knockdown results in muscle wasting. *Cells*, 9(10):2320, 2020.

[14] F. Beres, D. M. Kelen, **Robert Palovics**, and A. A. Benczur. Node embeddings in dynamic graphs. *Applied Network Science*, 4(1):1–25, 2019.

[15] A. A. Benczur, L. Kocsis, and **Robert Palovics**. Online machine learning algorithms over data streams. *Encyclopedia of Big Data Technologies*, 2019.

[16] F. Beres, **Robert Palovics**, A. Olah, and A. A. Benczur. Temporal walk based centrality metric for graph streams. *Applied Network Science*, 3(1):1–26, 2018.

[17] **Robert Palovics**, P. Szalai, J. Pap, E. Frigo, L. Kocsis, and A. A. Benczur. Location-aware online learning for top-k recommendation. *Pervasive and Mobile Computing*, 38:490–504, 2017.

[18] **Robert Palovics**, D. Kelen, and A. A. Benczur. Tutorial on open source online learning recommenders. *Tutorial at the 11th ACM Conference on Recommender Systems*, pages 400–401, 2017.

[19] **Robert Palovics** and A. A. Benczur. Raising graphs from randomness to reveal information networks. In *Proceedings of the Tenth ACM International Conference on Web Search and Data Mining*, pages 23–32. ACM, 2017.

[20] A. Mandli, **Robert Palovics**, M. Susits, and A. A. Benczur. Time series classification for scrap rate prediction in transfer molding. In *3rd SIGKDD Workshop on Mining and Learning from Time Series*, 2017.

[21] E. Frigo, **Robert Palovics**, D. Kelen, L. Kocsis, and A. Benczur. Online ranking prediction in non-stationary environments. In *Proceedings of the Temporal Reasoning in Recommender Systems Workshop at the 11th ACM Conference on Recommender Systems*. CEUR-WS. org, 2017.

[22] E. Frigo, **Robert Palovics**, D. Kelen, L. Kocsis, and A. Benczur. Alpenglow: Open source recommender framework with time-aware learning and evaluation. *Poster at the 11th ACM Conference on Recommender Systems*, 2017.

[23] F. Abel, A. Benczur, D. Kohlsdorf, M. Larson, and **Robert Palovics**. Recsys challenge 2016: Job recommendations. In *Proceedings of the 10th ACM Conference on Recommender Systems*, pages 425–426. ACM, 2016.

[24] **Robert Palovics**, P. Szalai, L. Kocsis, A. Szabo, E. Frigo, J. Pap, Z. K. Nyikes, and A. A. Benczur. Solving recsys challenge 2015 by linear models, gradient boosted trees and metric optimization. In *Proceedings of the 2015 International ACM Recommender Systems Challenge*, page 4. ACM, 2015.

[25] **Robert Palovics**, P. Szalai, L. Kocsis, J. Pap, E. Frigo, and A. A. Benczur. Location-aware online learning for top-k hashtag recommendation. In *LocalRec@ RecSys*, pages 36–39, 2015.

[26] **Robert Palovics**, B. Daroczy, A. Benczur, J. Pap, L. Ermann, S. Phan, A. D. Chepelianskii, and D. L. Shepelyansky. Statistical analysis of nomao customer votes for spots of france. *The European Physical Journal B*, 88(8):1–10, 2015.

[27] **Robert Palovics** and A. A. Benczur. Temporal influence over the last. fm social network. *Social Network Analysis and Mining*, 5(1):4, 2015.

[28] B. Daroczy, **Robert Palovics**, V. Wieszner, R. Farkas, and A. A. Benczur. Predicting user-specific temporal retweet count based on network and content information. In *INRA@ RecSys*, pages 6–13, 2015.

[29] B. Daroczy, D. Siklosi, **Robert Palovics**, and A. A. Benczur. Text classification kernels for quality prediction over the c3 data set. In *Proceedings of the 24th International Conference on World Wide Web*, pages 1441–1446. ACM, 2015.

[30] **Robert Palovics**, A. A. Benczur, L. Kocsis, T. Kiss, and E. Frigo. Exploiting temporal influence in online recommendation. In *Proceedings of the 8th ACM Conference on Recommender systems*, pages 273–280. ACM, 2014.

[31] **Robert Palovics**, F. Ayala-Gomez, B. Csikota, B. Daroczy, L. Kocsis, D. Spadacene, and A. A. Benczur. Recsys challenge 2014: an ensemble of binary classifiers and matrix factorization. In *Proceedings of the 2014 Recommender Systems Challenge*, pages 13–18. ACM, 2014.

[32] M. Balassi, **Robert Palovics**, and A. A. Benczur. Distributed frameworks for alternating least squares. In *Proceedings of the 2nd large scale recommender systems workshop at recsys*, 2014.

[33] **Robert Palovics**, B. Daroczy, and A. A. Benczur. Temporal prediction of retweet count. In *Cognitive Infocommunications (CogInfoCom), 2013 IEEE 4th International Conference on*, pages 267–270. IEEE, 2013.