Curriculum Vitae

Eran Halperin

Updated to : March 27, 2026.

Research areas:

Computational Medicine (machine learning in medical imaging, physiological waveforms, electronic medical records), Statistical Genomics (microbiome, epigenomics, genetics, single-cell techniques), Algorithms (graphs, approximation, combinatorial).

Education:

Ph.D. in Computer Science, Tel-Aviv University, under Prof. Uri Zwick.
M.Sc. in Computer Science, Tel-Aviv University, under Prof. Noga Alon.

Experience

Academic Research Positions:

2026-now **Professor**, Department of Computer Science, Courant Institute, **NYU**

2026-now **Research Professor**, Division of Precision Medicine, Department of Medicine, Langone, **NYU**

2013-now **Adjunct Professor**, Department of Computer Science, **UCLA**

2016-2023 **Professor**, Departments of Computational Medicine, Computer Science, Anesthesiology, and Human Genetics, University of California, Los Angeles (**UCLA**).

2017-2021 **Associate Director, Informatics**, The Institute of Precision Health, **UCLA**.

2008-2016 **Associate Professor**, Blavatnik School of Computer Science, and the Department of Molecular Microbiology and Biotechnology, **Tel-Aviv University**. Started as a Senior Lecturer and switched to Associate Professor in 2011.

2004-2016 **Senior Research Scientist** at the International Computer Science Institute (**ICSI, Berkeley**).

2003-2004 **Research Associate** at the Computer Science department of **Princeton** University.

2001-2003 **Post doc** at the Computer Science department of the University of California in **Berkeley**, and at the International Computer Science Institute (**ICSI**).
Hosts: Richard Karp, Christos Papadimitriou, Satish Rao, Alistair Sinclair.

Positions in the industry:

2025-2026 **Chief AI Officer**, MilaHealth (AI agents in healthcare).

2021-2024 **Senior Vice President of AI/ML** in **Optum AI** (formerly named **Optum Labs**)

2012-2020 **Computational Advisory Board** in **DNA Nexus** (computational infrastructure for genomics)

2011-2016 **Scientific Advisory Board** in **Genia Technologies** (nanopores sequencing technologies)

2012-2013 **Scientific Advisory Board** in **Gene by Gene** (ancestry inference from genetics)

2007-2008 **Director of Bioinformatics** in **Navigenics, Inc.** (genetic testing)

1997-2000 **Bioinformatics Scientist at the Algorithms group** in **Compugen LTD.**

Consulting and advising roles (selected): **Intel**, **Ultima Genomics**, **Invitae**, **Occam Law** , **Evogene**, **Micromedic**, **KHealth**

Funding

1. Personalized Risk Prediction for Prevention and Early Detection of Postoperative Failure to Rescue, **NIH-NIBIB**, R01EB035028 (co-I), Maxime Cannesson (PI), 9/1/2023-8/31/2027

2. Computational Genomics Summer Institute and Mentoring Network, **NIH-NIGMS** 1R25GM135043-01, (co-PI), Eleazar Eskin (PI), $1,554,615, 05/2020-04/2025.

3. Polygenic risk scores for diverse populations - bridging research and clinical care, **NIH-NHLBI** 1R01HL151152-01A1 (Sub-contract), Charles Kooperberg (PI), $47,106, 8/2020-07/2021.

4. Biomedical Informatics Tools for Applied Perioperative Physiology, **NIH- NIBIB** 1R01EB029751-01A1 (co-I), Maxime Cannesson (PI), $66,536, 5/2020-01/2024.

5. Methods for Genomic Analysis in Heterogeneous Tissues, **NIH-NHGRI** HG010505 (PI), $2,613,950, 9/.2019-6/2023.

6. Replication studies for high dimensional data: Insights into confounding and heterogeneity, **NSF** 1705197 (co-PI), Eleazar Eskin (PI), $499,995, 8/2019-7/2022.

7. Epigenetics of Socio-Environmental Effects on Asthma in Minorities, **NIH** 1R56MD013312-01 (co-I), Esteban Burchard (PI), Noah Zaitlen (PI). $458,438.

8. Machine Learning Models for the Prediction of Adverse Outcomes after Surgery using EMR and Genetic Data, David Geffen School of Medicine Seed Grant, $250,000, 9/1/2018-9/30/19.

9. Developing a pathway from genetic locus to gene for complex traits in rodents, **NIH-NIMH** 1R01MH115979 (co-I), Jonathan Flint (PI), 6/2018-2/2023.

10. III: Medium: Detecting Low Dimensional Structures in Genomic Data, **NSF** award number 1705197 (PI) , Eleazar Eskin (co-PI), and Jae-Hoon Sul (co-PI). Total award: $1,199,663, 08/15/2017-8/15/2021.

11. Computational Methods for the Analysis of Methylation Data, **Blavatnik Research Fund**, $50,000, period: 10/2015-10/2016.

12. Analytical method development for investigating the role of the X chromosome in population genetics and disease, **NIH** (Subcontract from Alon Keinan, Cornell). Total award: $63,358, 2014-2016.

13. Methods for the Analysis of Rare Variants in Disease DNA-Sequencing Studies, **ISF** (Leading PI). Total award: $\$264,000$, 2013-2017.

14. Methods for preprocessing population sequence data, Binational Science Foundation, **BSF** and the **Gilbert Foundation** (Leading PI with Eleazar Eskin). Total award: $\$197,600$, 2013-2017.

15. Reqsequencing and Functional Studies, **NIH** (subcontract). Total subcontract award: $303,780, period: 10/2011-9/2015.

16. Combinatorial Optimization Methods for Problems in Molecular Biology and Genetics, **NSF**: Award no. 1217615, $497,380, period: 9/1/2012 - 8/31/2014.

17. Integrated Analysis of Novel Molecular Diagnostic Markers for Type 2 Diabetes, German Israeli Foundation, **GIF** (leading PI with Thomas Illig). Total award: 199,800 Euros, period: 1/2012-12/2014.

18. Open Collaborative Research. **IBM** (PI, together with Ron Shamir and Saharon Rosset). Total award: $132,000, period: 10/2010-10/2012.

19. Efficient Design and Analysis of Disease Association Studies, Israeli Science Foundation, **ISF**. Total award: $223, 640, period: 10/2008-10/2012.

20. Genome-wide Association Study of Non-Hodgkin's Lymphoma, **NIH**: R01 (subcontract). Leading PI: Christine Skibola (UC Berkeley). Total subcontract award: $127,704., period: 08/01/2006-07/31/2011

21. Estimating Haplotype Frequencies, **NSF**: IIS-0513599 (leading PI). Total award: $603,773, period: 09/15/2005-08/31/2008.

22. Population Stratification Methods, **NSF**: IIS-0713254 (leading PI). Total award: $449,962, period: 08/15/2007-07/31/2009.

Awards and Honors:

2021 The **ISCB Fellow**

2014 The **Juludan Research Fund Prize**

2012 Chosen by The Marker Magazine (Israeli business magazine) as one of the **40 promising Israelis younger than 40**.

2010 The Raymond and Beverly Sackler **Career Development Chair**.

2010 The **Krill** prize for excellence in scientific research.

2001 The **Rothschild** fellowship (for post-doc).

2000 The **Intel** prize (for Ph.D.), Tel-Aviv University.

2000 The **Checkpoint** prize (for Ph.D.), Tel-Aviv University.

1999 The **Maus** prize (for Ph.D.), Tel-Aviv University.

1993 24th in the **Putnum** mathematics competition.

1991-92 Prize of excellence in the 32nd and in the 33rd Grossman mathematics Olympics of the Israel Institute of Technology, the Technion.

Academic Activities:

1. **Scientific committees (selected):**

   - Co-director and organizer, Computational Genomics Summer Institute (CGSI), 2016-now
   - Organizer: Bertinoro Computational Biology, 2014,2018.
   - Steering Committee, RECOMB-SEQ, 2013-2022.
   - Program Committee, RECOMB, 2015,2016
   - Program Committee, RECOMB-Genetics, 2016
   - Scientific program area chair, ISMB, 2011,2013, 2014.

2. **Invited speaker (selected recent talks)**

   2024 Keynote speaker, Health Systems Innovation Council, Alliance for South California Innovation, Cedars Sinai.
   2024 Invited speaker, University of Southern California QCB Seminar.
   2024 Invited speaker, NIH/NIDDK workshop on AI in precision medicine for diabetes and other chronic diseases.
   2024 Invited speaker, Generative AI in HealthCare Workshop, UCLA
   2023 Panel moderator, Ultima Genomics launch event, Napa Valley.
   2023 Panelist, SoCal Innovation, UCSD
   2022 Keynote speaker, Illumina event at the meeting of the American Society of Human Genetics
   2022 Invited speaker, Simons Institute, UC Berkeley
   2022 Panel moderator at IAAI-22
   2022 Keynote speaker, 6th International Workshop on Health Intelligence (co-occuring with AAAI).
   2022 Invited speaker, Department of Biostatistics and Bioinformatics, Duke University
   2022 Invited speaker, CTSI, UCLA
   2021 Invited speaker, Institute of Mathematics and Applications, University of Minnesota
   2021 Invited speaker, Hadassah Eye & Vision Innovation Forum in Jerusalem
   2020 Invited speaker, AI for COVID-19 in LA Symposium, University of Southern California (virtual)
   2020 Invited speaker, The Doheny-UCLA International Retina Symposium, Pasadena, CA
   2019 Invited speaker, Annual meeting of the American Society of Anesthesiology, Orlando.
   2019 Invited speaker and panelist, UC-wide AI in Biomedicine.
   2019 Invited speaker, Bioinformatics seminar series, UCSD.
   2018 Invited speaker, IPM Seminar series, Mount Sinai.
   2018 Invited speaker, CS Colloquium Series, University of Indiana
   2017 Invited speaker, Banff International Research Station, Oaxaca, Mexico.
   2017 Keynote speaker, NIPS workshop on Machine Learning in Computational Biology.
   2017 Keynote speaker, 2nd QCB Symposium, UCLA.
   2017 Invited speaker, department of Electrical Engineering, UCLA.
   2016 Invited speaker at the biostatistics seminar, Stanford University.
   2016 Invited speaker at the Mike Waterman Symposium, Los Angeles.

Students:

Post-docs

2021-2025 Dr. Oren Avram, UCLA (currently **faculty at Bar-Ilan University**)

2019-2020 Dr. Misagh Kordi, post-doc, UCLA.

2018-2020 Dr. Igor Mandric, post-doc, UCLA.

2014-2016 Dr. Yedael Waldman, Post-doc, Tel-Aviv University,

2009-2009 Dr. Noah Zaitlen, Post-doc, Tel-Aviv University. (currently **faculty at UCLA**)

2008-2009 Dr. Bogdan Pasaniuc, Post-doc, International Computer Science Institute, Berkeley (currently **faculty at U Penn**).

2007-2008 Dr. Lucia Conde, Post-doc, International Computer Science Institute, Berkeley (currently at **University College London**)

2006-2008 Dr. Gad Kimmel, Post-doc, International Computer Science Institute, Berkeley.

PhD

2021-now Berkin Durmus, PhD candidate, Computer Science, UCLA

2019-now Ulzee An, PhD candidate, Computer Science, UCLA.

2019-now Zeuyan Chen, PhD candidate, Computer Science, UCLA

2020-2023 Ella Petter, PhD candidate, Computer Science, UCLA.

2018-2023 Leah Briscoe, PhD candidate, Bioinformatics, UCLA

2020-2022 Nadav Rakocz, PhD candidate, Computer Science, UCLA.

2018-2022 Mike Thompson PhD candidate, Bioinformatics, UCLA (currently **post-doc at CRG, Barcelona**)

2018-2021 Brandon Jew, PhD candidate, Bioinformatics, UCLA

2018-2021 Brian Hill, PhD candidate, Computer Science, UCLA

2016-2020 Elior Rahmani, PhD candidate, Computer Science, UCLA (currently **faculty at Stanford**)

2016-2020 Liat Shenhav, PhD candidate, Computer Science, UCLA (currently **faculty at NYU**)

2013-2018 Regev Schweiger, PhD candidate, Computer Science, Tel-Aviv University (currently **faculty at Tel-Aviv University**).

2011-2018 Roye Rozov Ph.D, Computer Science, Tel-Aviv University.

2012-2016 Yael Baran, PhD , Computer Science, Tel-Aviv University (currently **researcher at Weizmann Institute**)

MSC

2015-2017 Gal Hayms (joint supervision with Dr. Itay Mayrose), MSc candidate, Life Sciences, Tel-Aviv University.

2013-2016 Goor Sasson, (joint supervision with Prof. Itzhak Mizrahi, Volcani), MSc candidate, Life Sciences, Tel-Aviv University

2013-2016 Elior Rahmani, MSc candidate, Computer Science, Tel-Aviv University.

2012-2014 Doron Shem-Tov, MSc, Computer Science, Tel-Aviv University.

2011-2013 Itamar Eskin , (joint supervision with Dr. Yoel Shkolnisky), M.Sc., Applied Math, Tel-Aviv University

2011-2014 Yaara Arkin, M.Sc., Bioinformatics track, Computer Science, Tel-Aviv University

2011-2015 Yaron Margalit, M.Sc. , Computer Science, Tel-Aviv University

2010-2013 Noam Mamet (joint supervision with Prof. Uri Gophna), M.Sc., Mathematical Biology track, Life Sciences, Tel-Aviv University

2009-2012 Tal Efros, M.Sc., Computer Science, Tel-Aviv University

2009-2012 Oron Navon, M.Sc., Bioinformatics track, Life Sciences, Tel-Aviv University

2009-2012 Yael Baran, MSc., Bioinformatics track, Computer Science, Tel-Aviv University

Teaching (selected):

2021 Machine Learning in Medicine (CS229), UCLA.

2021 Machine Learning in Genetics (CM124), UCLA.

2020 Machine Learning in Genetics (CM124), UCLA.

2019 Computational Genetics (CM124), UCLA.

2018 Computational Genetics (CM124), UCLA.

2017 Computational Genetics (CM124), UCLA.

Selected publications:

1. Avram O., et al., *Accurate prediction of disease-risk factors from volumetric medical scans by a deep vision model pre-trained with 2D scans*, **Nature Biomedical Engineering**, 2024.

2. Thompson M, Hill BL, Rakocz N, Chiang JN, Geschwind D, Sankararaman S, Hofer I, Cannesson M, Zaitlen N, Halperin E. *Methylation risk scores are associated with a collection of phenotypes within electronic health record systems.* **NPJ (Nature) Genomic Medicine**. 2022 Aug 25;7(1):50. doi: 10.1038/s41525-022-00320-1. PMID: 36008412; PMCID: PMC9411568.

3. Hill BL, Rakocz N, Rudas Á, Chiang JN, Wang S, Hofer I, Cannesson M, Halperin E. *Imputation of the continuous arterial line blood pressure waveform from non-invasive measurements using deep learning.* **Scientific Reports** 2021 Aug 3;11(1):15755. doi: 10.1038/s41598-021-94913-y. PMID: 34344934; PMCID: PMC8333060.

4. Mandric I, Schwarz T, Majumdar A, Hou K, Briscoe L, Perez R, Subramaniam M, Hafemeister C, Satija R, Ye CJ, Pasaniuc B, Halperin E. *Optimized design of single-cell RNA sequencing experiments for cell-type-specific eQTL analysis.* ,**Nature Communications**, 2020 Oct 30;11(1):5504. doi: 10.1038/s41467-020-19365-w. PMID: 33127880; PMCID: PMC7599215.

5. Jew B, Alvarez M, Rahmani E, Miao Z, Ko A, Garske KM, Sul JH, Pietiläinen KH, Pajukanta P, Halperin E. *Accurate estimation of cell composition in bulk expression through robust integration of single-cell information.* **Nature Communications** 2020 Apr 24;11(1):1971. doi: 10.1038/s41467-020-15816-6. Erratum in: Nat Commun. 2020 Jun 3;11(1):2891. PMID: 32332754; PMCID: PMC7181686.

6. Shenhav, Liat, Mike Thompson, Tyler A. Joseph, Leah Briscoe, Ori Furman, David Bogumil, Itzhak Mizrahi, Itsik Pe'er, and Eran Halperin. *FEAST: fast expectation-maximization for microbial source tracking.*, **Nature methods** (2019): 1.

7. Rahmani, E., Schweiger, R., Rhead, B., Criswell, L.A., Barcellos, L.F., Eskin, E., Rosset, S., Sankararaman, S. and Halperin, E. , *Cell-type-specific resolution epigenetics without the need for cell sorting or single-cell biology*, **Nature Communications**, Jul 31;10(1):3417, 2019.

8. Schweiger, Regev, Eyal Fisher, Omer Weissbrod, Elior Rahmani, Martina Müller-Nurasyid, Sonja Kunze, Christian Gieger, Melanie Waldenberger, Saharon Rosset, and Eran Halperin, *Detecting heritable phenotypes without a model using fast permutation testing for heritability and set-tests.*, **Nature communications** 9, no. 1 (2018): 4919.

9. Elior Rahmani, Noah Zaitlen, Yael Baran, Celeste Eng, Donglei Hu, Joshua Galanter, Sam Oh, Esteban G. Burchard, Eleazar Eskin, James Zou, and Eran Halperin, *Correcting for cell-type heterogeneity in DNA methylation: a comprehensive evaluation*, **Nature Methods**, 14(3), pp.218-219, 2017.

10. James Y. Zou, Danny S Park, Esteban G Burchard, Dara G Torgerson, Maria Pino-Yanes, Yun S. Song, Sriram Sankararaman*, Eran Halperin*, Noah Zaitlen*, *A genetic and socio-economic study of mate choice in Latinos reveals novel assortment patterns*, **Proceedings of the National Academy of Science (PNAS)**, 112.44 (2015): 13621-13626.
* Equal contribution

11. Gymrek M, McGuire AL, Golan D, Halperin E, Erlich Y., *Identifying personal genomes by surname inference*, **Science**, Jan 18;339(6117):321-4, 2013.

12. Yang WY, Novembre J, Eskin E, Halperin E, *A model-based approach for analysis of spatial structure in genetic data*, **Nature Genetics**, 20;44(6):725-31, 2012.

13. Sriram Sankararaman, Guillaume Obozinski, Michael I. Jordan, and Eran Halperin, *Genomic Privacy and Limits of Individual Detection in a Pool*, **Nature Genetics**, 41, 965 - 967 (2009).

Publication List

Journal papers:

1. Avram O., et al., *Accurate prediction of disease-risk factors from volumetric medical scans by a deep vision model pre-trained with 2D scans*, **Nature Biomedical Engineering**, 2024.

2. Balliu B, Douglas C, Seok D, Shenhav L, Wu Y, Chatzopoulou D, Kaiser W, Chen V, Kim J, Dev- erasetty S, Arnaudova I, Gibbons R, Congdon E, Craske MG, Freimer N, Halperin E, Sankararaman S, Flint J. *Personalized mood prediction from patterns of behavior collected with smartphones*, **Nature Digital Medicine**, 2024

3. Grunin M, Triffon D, Beykin G, Rahmani E, Schweiger R, Tiosano L, Khateb S, Hagbi-Levi S, Rinsky B, Munitz R, Winkler TW, Heid IM, Halperin E, Carmi S, Chowers I. *Genome wide association study and genomic risk prediction of age related macular degeneration in Israel.* **Scientific Reports**, 2024

4. Corradetti G, Rakocz N, Chiang JN, Avram O, Alagorie AR, Nittala MG, Karamat A, Boyer DS, Sarraf D, Halperin E, Sadda S. *Prediction of activity in eyes with macular neovascularization due to age-related macular degeneration using deep learning.* **Eye**, 2024

5. Briscoe L, Halperin E, Garud NR. *SNV-FEAST: microbial source tracking with single nucleotide variants*, **Genome Biol**. 2023 Apr 30;24(1):101.

6. Ganesh D, Chiang JN, Corradetti G, Zaitlen N, Halperin E, Sadda SR. *Effect of statins on the age of onset of age-related macular degeneration.* **Graefes Arch Clin Exp Ophthalmol**. 2023 Aug;261(8):2245-2255. doi: 10.1007/s00417-023-06017-0. Epub 2023 Mar 14. PMID: 36917316.

7. Rahmani E, Jew B, Halperin E. *The Effect of Model Directionality on Cell-Type-Specific Differential DNA Methylation Analysis.* **Front Bioinform**. 2022 Jan 18;1:792605. doi: 10.3389/fbinf.2021.792605. PMID: 36303752; PMCID: PMC9580934.

8. Thompson M, Gordon MG, Lu A, Tandon A, Halperin E, Gusev A, Ye CJ, Balliu B, Zaitlen N. *Multi-context genetic modeling of transcriptional regulation resolves novel disease loci.* **Nature Communications**. 2022 Sep 28;13(1):5704. doi: 10.1038/s41467-022-33212-0. PMID: 36171194; PMCID: PMC9519579.

9. Bhattacharya A, Boulier K, Chiu A, Knyazev S, Schwarz T, Freund M, Zhan L, Burch KS, Caggiano C, Hill B, Rakocz N, Balliu B, Denny CT, Sul JH, Zaitlen N, Arboleda VA, Halperin E, Sankararaman S, Butte MJ; UCLA Precision Health Data Discovery Repository Working Group, UCLA Precision Health ATLAS Working Group; Lajonchere C, Geschwind DH, Pasaniuc B. *Leveraging genomic diversity for discovery in an electronic health record linked biobank: the UCLA ATLAS Community Health Initiative.* **Genome Medicine**. 2022 Sep 9;14(1):104. doi: 10.1186/s13073-022-01106-x. Erratum in: Genome Med. 2022 Nov 16;14(1):128. PMID: 36085083; PMCID: PMC9461263.

10. An U, Shenhav L, Olson CA, Hsiao EY, Halperin E, Sankararaman S. *STENSL: Microbial Source Tracking with ENvironment SeLection.* **mSystems**. 2022 Oct 26;7(5):e0099521. doi: 10.1128/msystems.00995-21. Epub 2022 Sep 1. PMID: 36047699; PMCID: PMC9599664.

11. Thompson M, Hill BL, Rakocz N, Chiang JN, Geschwind D, Sankararaman S, Hofer I, Cannesson M, Zaitlen N, Halperin E. *Methylation risk scores are associated with a collection of phenotypes within electronic health record systems.* **NPJ Genomic Medicine**. 2022 Aug 25;7(1):50. doi: 10.1038/s41525-022-00320-1. PMID: 36008412; PMCID: PMC9411568.

12. Chiang JN, Corradetti G, Nittala MG, Corvi F, Rakocz N, Rudas A, Durmus B, An U, Sankararaman S, Chiu A, Halperin E, Sadda SR. *Automated Identification of Incomplete and Complete Retinal Epithelial Pigment and Outer Retinal Atrophy Using Machine Learning.* **Ophthalmol Retina**. 2023 Feb;7(2):118-126. doi: 10.1016/j.oret.2022.08.016. Epub 2022 Aug 19. PMID: 35995411.

13. Hofer IS, Kupina M, Laddaran L, Halperin E. *Integration of feature vectors from raw laboratory, medication and procedure names improves the precision and recall of models to predict postoperative mortality and acute kidney injury.* **Scientific Reports**. 2022 Jun 17;12(1):10254. doi: 10.1038/s41598-022-13879-7. PMID: 35715454; PMCID: PMC9205878.

14. Briscoe L, Balliu B, Sankararaman S, Halperin E, Garud NR. *Evaluating supervised and unsupervised background noise correction in human gut microbiome data.* **PLoS Comput Biol**. 2022 Feb 7;18(2):e1009838. doi: 10.1371/journal.pcbi.1009838. PMID: 35130266; PMCID: PMC8853548.

15. Hill BL, Rakocz N, Rudas Á, Chiang JN, Wang S, Hofer I, Cannesson M, Halperin E. *Imputation of the continuous arterial line blood pressure waveform from non-invasive measurements using deep learning.* **Scientific Reports** 2021 Aug 3;11(1):15755. doi: 10.1038/s41598-021-94913-y. PMID: 34344934; PMCID: PMC8333060.

16. Klinger D, Hill BL, Barda N, Halperin E, Gofrit ON, Greenblatt CL, Rappoport N, Linial M, Bercovier H. *Bladder Cancer Immunotherapy by BCG Is Associated with a Significantly Reduced Risk of Alzheimer's Disease and Parkinson's Disease.* **Vaccines** (Basel). 2021 May 11;9(5):491. doi: 10.3390/vaccines9050491. PMID: 34064775; PMCID: PMC8151667.

17. Rakocz N, Chiang JN, Nittala MG, Corradetti G, Tiosano L, Velaga S, Thompson M, Hill BL, Sankararaman S, Haines JL, Pericak-Vance MA, Stambolian D, Sadda SR, Halperin E. *Automated identification of clinical features from sparsely annotated 3-dimensional medical imaging*, **Nature Digital Medicine**, 2021 Mar 8;4(1):44. doi: 10.1038/s41746-021-00411-w. PMID: 33686212; PMCID: PMC7940637.

18. Saab FG, Chiang JN, Brook R, Adamson PC, Fulcher JA, Halperin E, Manuel V, Goodman-Meza D. *Discharge Clinical Characteristics and Post-Discharge Events in Patients with Severe COVID-19: A Descriptive Case Series.* **Journal of General Internal Medicine** 2021 Apr;36(4):1017-1022. doi: 10.1007/s11606-020-06494-7. Epub 2021 Feb 2. PMID: 33532963; PMCID: PMC7853705.

19. Mandric I, Schwarz T, Majumdar A, Hou K, Briscoe L, Perez R, Subramaniam M, Hafemeister C, Satija R, Ye CJ, Pasaniuc B, Halperin E. *Optimized design of single-cell RNA sequencing experiments for cell-type-specific eQTL analysis.* ,**Nature Communications**, 2020 Oct 30;11(1):5504. doi: 10.1038/s41467-020-19365-w. PMID: 33127880; PMCID: PMC7599215.

20. Goodman-Meza D, Rudas A, Chiang JN, Adamson PC, Ebinger J, Sun N, Botting P, Fulcher JA, Saab FG, Brook R, Eskin E, An U, Kordi M, Jew B, Balliu B, Chen Z, Hill BL, Rahmani E, Halperin E, Manuel V, *A machine learning algorithm to increase COVID-19 inpatient diagnostic capacity.* **PLoS One**. 2020 Sep 22;15(9):e0239474. doi: 10.1371/journal.pone.0239474. PMID: 32960917.

21. Miao Z, Alvarez M, Ko A, Bhagat Y, Rahmani E, Jew B, Heinonen S, Muñoz-Hernandez LL, Herrera-Hernandez M, Aguilar-Salinas C, Tusie-Luna T, Mohlke KL, Laakso M, Pietiläinen KH, Halperin E, Pajukanta P. *The causal effect of obesity on prediabetes and insulin resistance reveals the important role of adipose tissue in insulin resistance.* **PLoS Genetics** 2020 Sep 14;16(9):e1009018. doi: 10.1371/journal.pgen.1009018. PMID: 32925908.

22. Martino C, Shenhav L, Marotz CA, Armstrong G, McDonald D, Vázquez-Baeza Y, Morton JT, Jiang L, Dominguez-Bello MG, Swafford AD, Halperin E, Knight R. *Context-aware dimensionality reduction deconvolutes gut microbial community dynamics.* **Nature Biotechnology**. 2020 Aug 31. doi: 10.1038/s41587-020-0660-7. Epub ahead of print. PMID: 32868914.

23. Alvarez M, Rahmani E, Jew B, Garske KM, Miao Z, Benhammou JN, Ye CJ, Pisegna JR, Pietiläinen KH, Halperin E, Pajukanta P. *Enhancing droplet-based single-nucleus RNA-seq resolution using the semi-supervised machine learning classifier DIEM.* **Scientific reports**. 2020 Jul 3;10(1):11019. doi: 10.1038/s41598-020-67513-5. PMID: 32620816; PMCID: PMC7335186.

24. Mandric I, Hill BL, Freund MK, Thompson M, Halperin E. *BATMAN: Fast and Accurate Integration of Single-Cell RNA-Seq Datasets via Minimum-Weight Matching.* **iScience**. 2020 Jun 26;23(6):101185. doi: 10.1016/j.isci.2020.101185. Epub 2020 May 20. PMID: 32504875; PMCID: PMC7276436.

25. Agrawal A, Chiu AM, Le M, Halperin E, Sankararaman S. *Scalable probabilistic PCA for large-scale genetic variation data.* **PLoS Genetics** 2020 May 29;16(5):e1008773. doi: 10.1371/journal.pgen.1008773. PMID: 32469896; PMCID: PMC7286535.

26. Joseph TA, Shenhav L, Xavier JB, Halperin E, Pe'er I. *Compositional Lotka-Volterra describes microbial dynamics in the simplex.* **PLoS Computational Biology** 2020 May 29;16(5):e1007917. doi: 10.1371/journal.pcbi.1007917. PMID: 32469867; PMCID: PMC7325845.

27. Jew B, Alvarez M, Rahmani E, Miao Z, Ko A, Garske KM, Sul JH, Pietiläinen KH, Pajukanta P, Halperin E. *Accurate estimation of cell composition in bulk expression through robust integration of single-cell information.* **Nature Communications** 2020 Apr 24;11(1):1971. doi: 10.1038/s41467-020-15816-6. Erratum in: Nat Commun. 2020 Jun 3;11(1):2891. PMID: 32332754; PMCID: PMC7181686.

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Patents:

1. Issued: Systems and methods for automated diagnosis of disease related risk factors in 3d biomedical imaging (2024)

2. Issued: Biomarker prediction using optical coherence tomography (2023)

3. Pending: Composite training techniques for machine learning models (2023)

4. Pending: Data imputation using an interconnected variational autoencoder model (2023)

5. Pending: Application of personalized sensor-based risk profiles for impacts of external events (2023)

6. Pending: Optimized latent missing feature detection for machine learning models (2023)

7. Pending: Systems and methods for utilizing topic models to weight mixture-of-experts for improvement of language modeling (2023)

8. Pending: Temporal sequence causal transformer machine learning model (2023)

9. Pending: Processing different timescale data utilizing a model (2023)

10. Pending: Machine learning model training for improving anomaly detection (2023)
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