

SHAI CARMİ**PERSONAL**

Born: December 1981, Ramat-Gan, Israel
Family status: married + 3
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CURRENT OCCUPATION

2021- Associate professor
Braun School of Public Health and Community Medicine
The Faculty of Medicine
The Hebrew University of Jerusalem, Israel (HUJI)

EDUCATION

2005 B.Sc., Bar-Ilan University, Israel, Physics and Computer Science, summa cum laude
2006 M.Sc., Bar-Ilan University, Israel, Physics, accelerated track, magna cum laude
Advisor: Prof. Shlomo Havlin.
Thesis title: Statistical physics of complex networks
2010 Ph.D., Bar-Ilan University, Israel, Physics, with distinction
Advisor: Prof. Shlomo Havlin
Thesis title: Complex systems from communication networks to proteins:
statistical analysis and modeling

PAST ACADEMIC POSITIONS

2010-2011 Post-doctoral fellow, The Faculty of Life Sciences, Bar-Ilan University
Mentor: Dr. Erez Levanon
Topic: RNA and DNA editing in mammalian genomes
2011-2015 Post-doctoral scientist, Department of Computer Science, Columbia University
Mentor: Prof. Itsik Pe'er
Topics: Ashkenazi genetics; genetic sharing in founder populations
2015-2021 Senior lecturer (assistant professor)
Braun School of Public Health and Community Medicine,
The Faculty of Medicine
The Hebrew University of Jerusalem, Israel (HUJI)

TEACHING EXPERIENCE

2005-2010 Teaching assistant, Department of Physics, Bar-Ilan University
Courses: Introductory physics laboratory, Introductory physics for the life sciences, Thermodynamics and statistical mechanics
2016- Lecturer, School of Public Health, The Hebrew University of Jerusalem
○ Courses coordinated and taught alone: Statistical methods for biomedical sciences, Advanced topics in data analysis for public health and medicine, Personal genomics
○ Courses coordinated alone and taught with others: Statistical methods for medicine and dental medicine

- Courses taught with others: Statistical methods for public health, Academic and research skills
 - Courses only coordinated (alone): Introduction to R for biostatistics
- 2020 University-wide excellence (based on student evaluation)

FELLOWSHIPS, HONORS, AND AWARDS

Undergraduate

- 2001, 2002 The Open University president's list (as a non-degree student)
 2003, 2004, 2005 Bar-Ilan University dean's list
 2005 Wolf Foundation award (national)

Graduate

- 2005 Bar-Ilan University rector's award
 2007 Bar-Ilan University president's fellowship
 2007 Adams fellowship of The Israel Academy of Sciences and Humanities
 2007 'Interdisciplinary Technologies' fellowship of The Council for Higher Education of Israel (declined)
 2008 Bar-Ilan University dean's award
 2009 Wolf Foundation award (national)

Post-doctoral

- 2011 Human Frontier Science Program Cross Disciplinary Fellowship (international)
 2015 Alon fellowship of The Council for Higher Education of Israel (declined)

Principal investigator

- 2018 Work covered in Science magazine's 10 breakthroughs of 2018
 2019 Hebrew University Faculty of Medicine young researcher award
 2019 Hebrew University presidential Ben-Porath award to an excellent young investigator

PUBLICATIONS

Overall citations: 3800; *h-index*: 25; *i10-index*: 45 (Google Scholar)

Key publications as a principal investigator

1. J. Xue, T. Lencz, A. Darvasi, I. Pe'er, and **S. Carmi**. The Time and Place of European Admixture in Ashkenazi Jewish History. *PLoS Genet.* 13, e1006644 (2017).
2. L. King, J. Wakeley, and **S. Carmi**. A non-zero variance of Tajima's estimator for two sequences even for infinitely many unlinked loci. *Theor. Popul. Biol.* 122, 22 (2018).
3. Y. Erlich, T. Shor, I. Pe'er, and **S. Carmi**. Identity inference of genomic data using long-range familial searches. *Science* 362, 690 (2018). [Covered by Science Magazine's 10 breakthroughs of 2018.](#)
4. E. Granot-Hershkovitz, D. Karasik, Y. Friedlander, ..., I. Peter, **S. Carmi***, and H. Hochner*. A study of Kibbutzim in Israel reveals risk factors for cardiometabolic traits and subtle population structure. *Eur. J. Hum. Genet.* 26, 1848 (2018).
5. R. Schweiger, Y. Erlich, and **S. Carmi**. FactorialHMM: Fast and exact inference in factorial hidden Markov models. *Bioinformatics* 35, 2162 (2019).
6. D. Backenroth, F. Zahdeh, ..., G. Altarescu*, **S. Carmi***, and D. A. Zeevi*. Haploseek: A 24-hour all-in-one method for preimplantation genetic diagnosis (PGD) of monogenic disease and aneuploidy. *Genet. Med.* 21, 1390 (2019).
7. D. Backenroth and **S. Carmi**. A test for deviations from expected genotype frequencies on the X chromosome for sex-biased admixed populations. *Heredity* 123, 470 (2019).

8. H. Fridman, D. Behar, **S. Carmi**, and E. Levy-Lahad. Preconception carrier screening yield: effect of variants of unknown significance in partners of carriers with clinically significant variants. *Genet. Med.*, 22, 646 (2020).
9. E. Karavani*, O. Zuk*, D. Zeevi, ..., T. Lencz*, and **S. Carmi***. Screening human embryos for polygenic traits has limited utility. *Cell*, 179, 1424 (2019).
10. L. Agranat-Tamir, S. Waldman, ..., B. Yakir, R. Pinhasi*, **S. Carmi***, I. Finkelstein*, L. Carmel*, and D. Reich*. The Genomic History of the Bronze Age Southern Levant. *Cell* 181, 1146 (2020).

All publications

Peer-reviewed journal papers

1. **S. Carmi**, E. Y. Levanon, S. Havlin, and E. Eisenberg. Connectivity and expression in protein networks: Proteins in a complex are uniformly expressed. *Phys. Rev. E* **73**, 031909 (2006).
2. **S. Carmi**, R. Cohen, and D. Dolev. Searching complex networks efficiently with minimal information. *Europhys. Lett.* **74**, 1102 (2006).
3. **S. Carmi**, S. Havlin, S. Kirkpatrick, Y. Shavitt, and E. Shir. A Model of Internet topology using k -shell decomposition, *P. Natl. Acad. Sci. USA* **104**, 11150 (2007).
4. E. Lopez, R. Parshani, R. Cohen, **S. Carmi**, and S. Havlin. Limited path percolation in complex networks. *Phys. Rev. Lett.* **99**, 188701 (2007).
5. M. Maragakis, **S. Carmi**, D. ben-Avraham, S. Havlin, and P. Argyrakis. Priority diffusion model in lattices and complex networks. *Phys. Rev. E (Rapid Communication)* **77**, 020103 (2008).
6. **S. Carmi**, Z. Wu, S. Havlin, and H. E. Stanley. Transport in networks with multiple sources and sinks. *EPL* **84**, 28005 (2008).
7. A. Kittas, **S. Carmi**, S. Havlin, and P. Argyrakis. Trapping in complex networks. *EPL* **84**, 40008 (2008).
8. **S. Carmi**, P. L. Krapivsky, and D. ben-Avraham, Partition of networks into basins of attraction. *Phys. Rev. E* **78**, 066111 (2008).
9. **S. Carmi**, E. Y. Levanon, and E. Eisenberg. Efficiency of complex production in changing environment. *BMC Sys. Biol.* **3**:3 (2009).
10. **S. Carmi**, S. Havlin, C. Song, K. Wang, and H. A. Makse. Energy-landscape network approach to the glass transition. *J. Phys. A: Math. Theor.* **42**, 105101 (2009).
11. **S. Carmi**, S. Carter, J. Sun, and D. ben-Avraham. Asymptotic behavior of the Kleinberg model. *Phys. Rev. Lett.* **102**, 238702 (2009).
12. L. Turgeman, **S. Carmi**, and E. Barkai. Fractional Feynman-Kac equation for non-Brownian functionals. *Phys. Rev. Lett.* **103**, 190201 (2009).
13. H. Goldshmidt, D. Matas, A. Kabi, **S. Carmi**, R. Hope, and S. Michaeli. Persistent ER stress induces the Spliced Leader RNA Silencing pathway (SLS), leading to programmed cell death in *Trypanosoma brucei*. *PLoS Pathog.* **6**, e1000731 (2010).
14. R. Parshani, **S. Carmi**, and S. Havlin. Epidemic threshold for the Susceptible-Infectious-Susceptible model on random networks. *Phys. Rev. Lett.* **104**, 258701 (2010).
15. N. G. Kolev, J. B. Franklin, **S. Carmi**, H. Shi, S. Michaeli, and C. Tschudi. The transcriptome of the human pathogen *Trypanosoma brucei* at single-nucleotide resolution. *PLoS Pathog.* **6**, e1001090 (2010).
16. **S. Carmi**, L. Turgeman, and E. Barkai. On distributions of functionals of anomalous diffusion paths. *J. Stat. Phys.* **141**, 1071 (2010).

17. **S. Carmi**, I. Borukhov, and E. Y. Levanon. Identification of widespread ultra-edited human RNA. *PLoS Genet.* **7**, e1002317 (2011).
18. **S. Carmi**, G. M. Church, and E. Y. Levanon. Large scale DNA editing of retrotransposons accelerates mammalian genome evolution. *Nat. Commun.* **2**, 519 (2011).
19. **S. Carmi** and E. Barkai. Fractional Feynman-Kac equation for weak ergodicity breaking. *Phys. Rev. E* **84**, 061104 (2011).
20. S. K. Gupta, **S. Carmi**, H. Waldman Ben-Asher, I. D. Tkacz, I. Naboishchikov, and S. Michaeli. Basal splicing factors regulate the stability of mature mRNAs in Trypanosomes. *J. Biol. Chem.* **7**, 4991 (2013).
21. **S. Carmi**, P. F. Palamara, V. Vacic, T. Lencz, A. Darvasi, and I. Pe'er. The variance of identity-by-descent sharing in the Wright-Fisher model. *Genetics* **193**, 911 (2013).
22. S. K. Gupta, I. Kosti, G. Plaut, A. Pivko, I. D. Tkacz, S. Cohen-Chalamish, D. K. Biswas, C. Wachtel, H. Waldman Ben-Asher, **S. Carmi**, F. Glaser, Y. Mandel-Gutfreund, and S. Michaeli. The hnRNP F/H homologue of *Trypanosoma brucei* is differentially expressed in the two life cycle stages of the parasite and regulates splicing and mRNA stability. *Nucleic Acids Res.* **41**, 6577 (2013).
23. N. Bastas, M. Maragakis, P. Argyrakis, D. ben-Avraham, S. Havlin, and **S. Carmi**. Random walk with priorities in communication-like networks. *Phys. Rev. E* **88**, 022803 (2013).
24. S. K. Gupta, V. Chikne, D. Eliaz, I. D. Tkacz, I. Naboishchikov, **S. Carmi**, H. Waldman Ben-Asher, and S. Michaeli. Two splicing factors carrying serine-arginine motifs, TSR1 and TSR1IP, regulate splicing, mRNA stability and rRNA processing in *Trypanosoma brucei*. *RNA Biol.* **11**, 715 (2014).
25. H. T. Porath, **S. Carmi**, and E. Y. Levanon. A genome-wide map of hyper-edited RNA reveals numerous new sites. *Nat. Commun.* **5**, 4726 (2014).
26. **S. Carmi**, K. Y. Hui, E. Kochav, X. Liu, J. Xue, F. Grady, S. Guha, K. Upadhyay, D. Ben-Avraham, S. Mukherjee, B. M. Bowen, T. Thomas, J. Vijai, M. Cruts, G. Froyen, D. Lambrechts, S. Plaisance, C. Van Broeckhoven, P. Van Damme, H. Van Marck, N. Barzilai, A. Darvasi, K. Offit, S. Bressman, L. J. Ozelius, I. Peter, J. H. Cho, H. Ostrer, G. Atzmon, L. N. Clark, T. Lencz, and I. Pe'er. Sequencing an Ashkenazi reference panel supports population-targeted personal genomics and illuminates Jewish and European origins. *Nat. Commun.* **5**, 4835 (2014).
27. **S. Carmi**, P. R. Wilton, J. Wakeley, and I. Pe'er. A renewal theory approach to IBD sharing. *Theor. Popul. Biol.* **97**, 35 (2014).
28. J. Zidan*, D. Ben-Avraham*, **S. Carmi***, T. Maray, E. Friedman, and G. Atzmon. Genotyping of geographically diverse Druze trios reveals substructure and a recent bottleneck. *Eur. J. Hum. Genet.* **23**, 1093 (2015).
29. P. R. Wilton, **S. Carmi***, and A. Hobolth*. The SMC' is a highly accurate approximation to the ancestral recombination graph. *Genetics* **200**, 343 (2015).
30. B. Baskovich, S. Hiraki, K. Upadhyay, P. Meyer, **S. Carmi**, N. Barzilai, A. Darvasi, K. Offit, S. Bressman, L. Ozelius, I. Peter, J. Cho, G. Atzmon, L. Clark, T. Lencz, I. Pe'er, H. Ostrer, and C. Oddoux. Expanded genetic screening panel for the Ashkenazi Jewish Population. *Genet. Med.* **18**, 522 (2016).
31. A. Quint, M. Sagi, **S. Carmi**, H. Daum, Z. Ben Neriah, V. Meiner, O. Elpeleg, and I. Lerer. An Ashkenazi founder mutation in the PKHD1 gene. *Eur. J. Med. Genet.* **59**, 86 (2016).
32. S. Yang, **S. Carmi**, and I. Pe'er. Rapidly registering identity-by-descent across ancestral recombination graphs. *J. Comput. Biol.* **23**, 495 (2016).
33. R. Jaron, N. Rosenfeld, F. Zahdeh, **S. Carmi**, L. Beni-Adani, R. Segel, S. Zeligson, L. Carmel, P. Renbaum, and E. Levy-Lahad. Expanding the phenotype of CRB2 mutations – A new ciliopathy syndrome? *Clin. Genet.* **90**, 540 (2016).

34. R. Hope, K. Egarmina, K. Voloshin, H. Waldman Ben-Asher, **S. Carmi**, D. Eliaz, Y. Drori, and S. Michaeli. Transcriptome and proteome analyses and the role of atypical calpain protein and autophagy in the spliced leader silencing (SLS) pathway in *Trypanosoma brucei*. *Mol. Microbiol.* **102**, 1 (2016).
35. J. Vijai, S. Topka, D. Villano, V. Ravichandran, K. N. Maxwell, A. Maria, T. Thomas, P. Gaddam, A. Lincoln, S. Kazzaz, B. Wenz, **S. Carmi**, K. A. Schrader, S. N. Hart, S. M. Lipkin, S. L. Neuhausen, M. F. Walsh, L. Zhang, F. Lejbkowitz, H. Rennert, Z. K. Stadler, M. Robson, J. N. Weitzel, M. J. Daly, F. J. Couch, K. L. Nathanson, L. Norton, G. Rennert, K. Offit. A recurrent *ERCC3* truncating mutation confers moderate risk for breast cancer. *Cancer Discov.* **6**, 1267 (2016).
36. E. Gilbert, **S. Carmi**, S. Ennis, J. Wilson, and G. Cavalleri. Genomic insights into the population structure and history of the Irish Travellers. *Sci. Rep.* **7**, 42187 (2017).
37. J. Xue, T. Lencz, A. Darvasi, I. Pe'er, and **S. Carmi**. The Time and Place of European Admixture in Ashkenazi Jewish History. *PLoS Genet.* **13**, e1006644 (2017).
38. Y. Einhorn, D. Weissglas-Volkov, **S. Carmi**, H. Ostrer, E. Friedman, and N. Shomron. Differential analysis of mutations in the Jewish Population and its implications on diseases. *Genet. Res., Camb.* **99**, e3 (2017).
39. D. M. Behar, L. Saag, M. Karmin, M. G. Gover, J. D. Wexler, L. F. Sanchez, E. Greenspan, A. Kushniarevich, O. Davydenko, H. Sahakyan, L. Yepiskoposyan, A. Boattini, S. Sarno, L. Pagani, **S. Carmi**, S. Tzur, E. Metspalu, C. Bormans, K. Skorecki, M. Metspalu, S. Rootsi, and R. Villems. The genetic variation in the R1a clade among the Ashkenazi Levites' Y chromosome. *Sci. Rep.* **7**, 14969 (2017).
40. K. Y. Hui, H. Fernandez-Hernandez, J. Hu, A. Schaffner, N. Pankratz, N.-Y. Hsu, L.-S. Chuang, **S. Carmi**, N. Villaverde, X. Li, M. Rivas, A. P. Levine, X. Bao, P. R. Labrias, T. Haritunians, D. Ruane, K. Gettler, E. Chen, D. Li, E. R. Schiff, N. Pontikos, N. Barzilai, S. R. Brant, S. Bressman, A. S. Cheifetz, L. N. Clark, M. J. Daly, R. J. Desnick, R. H. Duerr, S. Katz, T. Lencz, R. H. Myers, H. Ostrer, L. Ozelius, H. Payami, Y. Peter, J. D. Rioux, A. W. Segal, W. K. Scott, M. S. Silverberg, J. M. Vance, I. Ubarretxena-Belandia, T. Foroud, G. Atzmon, I. Pe'er, Y. Ioannou, D. P. B. McGovern, Z. Yue, E. E. Schadt, J. H. Cho, and I. Peter. Functional variants in the *LRRK2* gene confer shared effects on risk for Crohn's disease and Parkinson's disease. *Sci. Transl. Med.* **10**, eaai7795 (2018).
41. D. Rothschild, O. Weissbrod, E. Barkan, A. Kurilshikov, T. Korem, D. Zeevi, P. I. Costea, S. Shilo, D. Lador, A. Godneva, I. N. Kalka, N. Bar, A. V. Vila, N. Zmora, M. Pevsner-Fischer, D. Israeli, N. Kosower, G. Malka, B. C. Wolf, T. Avnit-Sagi, M. Lotan-Pompan, A. Weinberger, Z. Halpern, **S. Carmi**, J. Fu, C. Wijmenga, A. Zhernakova, E. Elinav, and E. Segal. Environmental factors dominate over host genetics in shaping human gut microbiota composition. *Nature* **555**, 210 (2018).
42. T. Lencz, J. Yu, C. Palmer, **S. Carmi**, D. Ben-Avraham, N. Barzilai, S. Bressman, A. Darvasi, J. H. Cho, L. N. Clark, Z. H. Gümüş, V. Joseph, R. Klein, S. Lipkin, K. Offit, H. Ostrer, L. J. Ozelius, I. Peter, G. Atzmon, and I. Pe'er. High-depth whole genome sequencing of an Ashkenazi Jewish reference panel: enhancing sensitivity, accuracy, and imputation. *Hum. Genet.* **137**, 343 (2018).
43. L. King, J. Wakeley, and **S. Carmi**. A non-zero variance of Tajima's estimator for two sequences even for infinitely many unlinked loci. *Theor. Popul. Biol.* **122**, 22 (2018).
44. Y. Yehuda, B. Blumenfeld, N. Mayorek, K. Makedonski, O. Vardi, L. Cohen-Daniel, Y. Mansour, S. Baror-Sebban, H. Masika, M. Farago, M. Berger, **S. Carmi**, Y. Buganim, A. Koren, and I. Simon. Germline DNA replication timing shapes mammalian genome composition. *Nucleic Acids Res.* **46**, 8299 (2018).
45. G. Rosner, N. Gluck, **S. Carmi**, D. Bercovich, N. Fliss-Issakov, M. Ben-Yehoyada, S. Aharon-Caspi, E. Kellerman, H. Strul, O. Shibolet, and R. Kariv. *POLD1* and *POLE* Gene Mutations in

- Jewish Cohorts of Early-Onset Colorectal Cancer and of Multiple Colorectal Adenomas. *Dis. Colon Rectum* **61**, 1073 (2018).
46. Y. Erlich, T. Shor, I. Pe'er, and **S. Carmi**. Identity inference of genomic data using long-range familial searches. *Science* **362**, 690 (2018).
 47. E. Granot-HersHKovitz, D. Karasik, Y. Friedlander, L. Rodriguez-Murillo, R. Dorajoo, J. Liu, A. Sewda, I. Peter, **S. Carmi***, and H. Hochner*. A study of Kibbutzim in Israel reveals risk factors for cardiometabolic traits and subtle population structure. *Eur. J. Hum. Genet.* **26**, 1848 (2018).
 48. A. L. Severson, **S. Carmi**, and N. A. Rosenberg. The effect of consanguinity on between-individual identity-by-descent sharing. *Genetics* **212**, 305 (2019).
 49. D. A. Zeevi, F. Zahdeh, Y. Kling, P. Renbaum, E. Levy-Lahad, **S. Carmi**, and G. Altarescu. Off the street phasing (OTSP): No hassle haplotype phasing for molecular PGD applications. *J. Assist. Reprod. Gen.* **36**, 727 (2019).
 50. R. Schweiger, Y. Erlich, and **S. Carmi**. FactorialHMM: Fast and exact inference in factorial hidden Markov models. *Bioinformatics* **35**, 2162 (2019).
 51. D. Backenroth, F. Zahdeh, Y. Kling, A. Peretz, T. Rosen, D. Kort, S. Zeligson, T. Dror, S. Kirshberg, E. Burak, R. Segal, E. Levy-Lahad, D. Zangen, G. Altarescu*, **S. Carmi***, and D. A. Zeevi*. Haploseek: A 24-hour all-in-one method for preimplantation genetic diagnosis (PGD) of monogenic disease and aneuploidy. *Genet. Med.* **21**, 1390 (2019).
 52. D. Backenroth and **S. Carmi**. A test for deviations from expected genotype frequencies on the X chromosome for sex-biased admixed populations. *Heredity* **123**, 470 (2019).
 53. M. Winther, S. Shpitzen, O. Yaacov, J. Landau, L. Oren, L. Foroozan-Rosenberg, N. Lev Cohain, D. Schurr, V. Meiner, A. Szalat, **S. Carmi**, M. R. Hayden, E. Leitersdorf, and R. Durst. In search for genetic explanation for LDLc variability in an FH family: Common SNPs and a rare mutation in microsomal triglyceride transfer protein explain only part of LDL variability in an FH family. *J. Lipid Res.* **60**, 1733 (2019).
 54. The ROHGen Consortium (including A. Helavy and **S. Carmi**). Associations of autozygosity with a broad range of human phenotypes. *Nat. Commun.* **10**, 4957 (2019).
 55. E. Karavani*, O. Zuk*, D. Zeevi, N. Barzilai, N. C. Stefanis, A. Hatzimanolis, N. Smyrnis, D. Avramopoulos, L. Kruglyak, G. Atzmon, M. Lam, T. Lencz*, and **S. Carmi***. Screening human embryos for polygenic traits has limited utility. *Cell* **179**, 1424 (2019).
 56. M. Caballero, D. N. Seidman, Y. Qiao, J. Sannerud, T. D. Dyer, D. M. Lehman, J. E. Curran, R. Duggirala, J. Blangero, **S. Carmi**, and A. L. Williams. Crossover interference and sex-specific genetic maps shape identical by descent sharing in close relatives. *PLoS Genet.* **15**, e1007979 (2019).
 57. M. Grunin, G. Beykin, E. Rahmani, R. Schweiger, G. Barel, S. Hagbi-Levi, S. Elbaz-Hayoun, B. Rinsky, M. Ganiel, **S. Carmi**, E. Halperin, I. Chowers. Association of a variant in VWA3A with response to anti-VEGF treatment in neovascular age-related macular degeneration. *Invest. Ophthalmol. Vis. Sci.* **61**, 48 (2020).
 58. H. Fridman, D. M. Behar, **S. Carmi**, and E. Levy-Lahad. Preconception carrier screening yield: effect of variants of unknown significance in partners of carriers with clinically significant variants. *Genet. Med.* **22**, 646 (2020).
 59. L. Agranat-Tamir, S. Waldman, M. Martin, D. Gokhman, N. Mishol, T. Eshel, O. Cheronet, N. Rohland, S. Mallick, N. Adamski, A. Marie Lawson, M. Mah, M. Michel, J. Oppenheimer, K. Stewardson, F. Candilio, D. Keating, B. Gamarra, S. Tzur, R. Kalisher, S. Bechar, V. Eshed, D. J. Kennett, M. Faerman, N. Yahalom-Mack, J. M. Monge, Y. Govrin, Y. Erel, B. Yakir, R. Pinhasi*, **S. Carmi***, I. Finkelstein*, L. Carmel*, and D. Reich*. The Genomic History of the Bronze Age Southern Levant. *Cell* **181**, 1146 (2020).
 60. H. Fridman, H. G. Yntema, R. Magi, R. Andreson, A. Metspalu, M. Mezzavila, C. Tyler-Smith, Y. Xue, **S. Carmi**, E. Levy-Lahad, C. Gilissen, and H. Brunner. The landscape of

autosomal-recessive pathogenic variants in European populations reveals phenotype-specific effects. *Am. J. Hum. Genet.* **108**, 608 (2021).

61. A. L. Severson, **S. Carmi**, and N. A. Rosenberg. Variance and limiting distribution of coalescence times in a diploid model of a consanguineous population. *Theor. Popul. Biol.* (2021).
62. D. A. Zeevi*, D. Backenroth*, E. Hakam-Spector, P. Renbaum, T. Mann, F. Zahdeh, R. Segel, S. Zeligson, T. Eldar-Geva, I. Ben-Ami, A. Ben Yehuda, **S. Carmi***, G. Altarescu*. Expanded clinical validation of *Haploseek* for comprehensive preimplantation genetic testing. *Genet. Med.* (2021).
63. T. Lencz, J. Yu, R. Rashid Khan, **S. Carmi**, M. Lam, D. Ben-Avraham, N. Barzilai, S. Bressman, A. Darvasi, J. H. Cho, L. N. Clark, Z. H. Gümüŝ, J. Vijai, R. J. Klein, S. Lipkin, K. Offit, H. Ostrer, L. J. Ozelius, I. Peter, A. K. Malhotra, G. Atzmon, and I. Pe'er. Novel Ultra-Rare Exonic Variants Identified in a Founder Population Implicate Cadherins in Schizophrenia. *Neuron* (2021)

Other peer-reviewed publications

Reviews

1. I. Tessler, G. Goudot, J. Albuissou, **S. Carmi**, S. Shpitzen, E. Messas, D. Gilon, and R. Durst. Bicuspid Aortic Valve: Genetic and Clinical Insights. *Aorta* (2021).

Conference papers

2. S. Yang, **S. Carmi**, and I. Pe'er. Rapidly registering identity-by-descent across ancestral recombination graphs. *Lect. Notes Comput. Sc.* **9029**, 340 (2015). [RECOMB 2015]
3. A. Jaffe, R. Weiss, **S. Carmi**, Y. Kluger, and B. Nadler. Learning binary latent variable models: a tensor eigenpair approach. ICML 2018.

Comments

4. G. Lázaro-Muñoz, S. Pereira, **S. Carmi**, and T. Lencz. Screening Embryos for Polygenic Conditions and Traits: Ethical Considerations for an Emerging Technology. *Genet. Med.* **23**, 432 (2021).

Conference and workshop proceedings

5. E. Lopez, **S. Carmi**, S. Havlin, S. Buldyrev, and H. E. Stanley. Anomalous electrical and frictionless flow conductance in complex networks. *Physica D* **224**, 69 (2006). [Proceedings of the workshop “*Dynamics on Complex Networks and Applications*”, Dresden, 2006]
6. **S. Carmi**, Z. Wu, E. Lopez, S. Havlin, and H. E. Stanley. Transport between multiple users in complex networks. *Eur. Phys. J. B* **57**, 165 (2007). [Proceedings of the 5th International Conference “*Applications of Physics in Financial Analysis*” (APFA5), Torino, 2006]

Perspectives (not peer-reviewed)

1. **S. Carmi**. Genealogy: The challenges of maintaining genetic privacy. *eLife* **9**, e54467 (2020).

Book chapters

1. **S. Carmi** and E. Barkai. Fractional Feynman-Kac equation for anomalous diffusion functionals. Chapter 8 in *Fractional Dynamics: Recent Advances*, Eds. J. Klafter, S. C. Lim, and R. Metzler (World Scientific, Singapore, 2011).

MEDIA COVERAGE

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- 2006 *Limited path percolation in complex networks*. Physical Review Focus.
- 2007 *A model of Internet topology*. MIT Technology Review, Science News, IEEE Spectrum, PopSci, Scientific American, Bloomberg News, Wired, and over 15 others.
- 2011 *Large scale DNA editing of retrotransposons*. Ha'aretz.

- 2014 *Sequencing an Ashkenazi reference panel*. LA Times, NBC News, Yahoo! News, The Scientist, National Geographic, Genome Web, Ha'aretz, The Jewish Daily Forward, and over 20 others, including radio and TV shows in Israel.
- 2014 *A renewal theory approach to IBD sharing*. Stanford Scope.
- 2014 *Genotyping of geographically diverse Druze trios*. Ha'aretz, Makor Rishon, NRG (Israel), Gene Expression blog.
- 2015 *Expanded Genetic Screening Panel*. The Jerusalem Post.
- 2016 40 most promising under 40. TheMarker Magazine, Israel
- 2017 *Genomic insights into the Irish Travellers*. Genome Web, Daily Mail, The Irish Times, The Irish Post, Irish Central, and others.
- 2018 *Functional variants in the LRRK2 gene*. Genome Web, Science Daily.
- 2018 *The human gut microbiota composition*. The Scientist, Science Daily, MedicalXpress, ynet, Ha'aretz, and others.
- 2018 *Identity inference of genomic data*. The New York Times, The Wall Street Journal, The Washington Post, The Atlantic, Time, Los Angeles Times, NBC News, ABC News, CNN, Bloomberg, Yahoo News, Wired, Science, Nature, Scientific American, The Scientist, GenomeWeb, IEEE Spectrum, Ha'aretz, The Marker, and others. Covered in Science Magazine's breakthroughs of 2018.
- 2018 *A 24-hour all-in-one method for preimplantation genetic diagnosis*. Doctors Only, Mako (Israel).
- 2019 *A study of Kibbutzim in Israel*. The NY Jewish Week.
- 2019 *Screening human embryos for polygenic traits*. Science, GenomeWeb, MIT Technology Review, Science News, Live Science, Inverse, Science Daily, Futurism, U.S. News, The Telegraph, Daily Mail, The Irish News, Ha'aretz, The Jerusalem Post, Yahoo News, Kan-culture (radio), and others
- 2020 *The Genomic History of the Bronze Age Southern Levant*. National Geographic, Science Daily, Genome Web, Ha'aretz, The Times of Israel, ynet
- 2018- Media appearances as an expert (in Israel). *Newspapers and magazines*: Ha'aretz (multiple times), Yedioth Ahronoth, Israel Hayom, Times of Israel, Galileo, Captain Kids. *TV*: Channel 10, ynet (online). *Radio*: 103FM, Tel-Aviv radio.

FUNDING

2015-2023	Startup grant, The Faculty of Medicine (HUJI), \$200,000
2016-	Private gift, The Barouh and Channah Berkovits Foundation, \$15,000
2017-2020	Abisch-Frenkel Foundation for the promotion of life sciences young researcher grant 17/HU6, "Evaluating the potential of personalized risk prediction for common diseases in the Ashkenazi Jewish population". \$55,000
2017	Israel Science Foundation (ISF) new faculty equipment grant 932/17, "A computing and storage system for statistical and population genetics research." 202,215₪.
2017-2021	Israel Science Foundation (ISF) personal grant 407/17, "New methods for using genetic variation and genealogical records for inferring recent demographic events." 1,000,000₪.
2018-2019	German-Israeli Foundation for Scientific Research and Development (GIF) Young Scientists' Program grant I-2489-407.6/2017, "Reconstructing recent population histories using multi-individual haplotype sharing and applications to Ashkenazi Jewish genetics." €18,000.
2019-2022	United States – Israel Binational Science Foundation (BSF) regular grant 2017024, "Theory of consanguinity and its effects on genomic sharing within and

- between individuals.” Joint with Noah Rosenberg, Stanford University. \$216,000 (equally shared).
- 2018- Hebrew University president award for the publication of high profile research, 10,000₪.
- 2019-2023 Sub-award of the Israel Science Foundation (ISF) program in precision medicine grant 3485/19, “Combined omics and electronic medical records-big data for prediction of phenotype sub-types, progression, and treatment outcome in age-related macular degeneration.” Lead PI: Itay Chowers, Hadassah Medical Center. Amount to SC: TBD.
- 2020-2021 Hebrew University Center for Interdisciplinary Data Science Research (CIDR) grant for collaborations between data science researchers and researchers from other fields, “Developing the next generation of preimplantation genetic testing.” Joint with David Zeevi, Shaare Zedek Medical Center. 75,000₪.
- 2021-2022 Hebrew University Center for Interdisciplinary Data Science Research (CIDR). Competitive renewal of the grant “Developing the next generation of preimplantation genetic testing.” Joint with David Zeevi, Shaare Zedek Medical Center. 45,000₪.
- 2020- Hebrew University Ben-Porath award for excellent young investigators. 15,000₪.
2021-2022 The Israeli Council for Higher Education (CHE) (via the Weizmann Data Science Research Center) Collaborative Research Grants in Data Science 2020-P129437, “Mining the largest dataset on sexual mating preference and fitness inheritance.” Joint with Yitzhak Pilpel, Weizmann Institute of Science. 100,000₪. Amount to SC: 20,000₪.
- 2020-2024 Israel Science Foundation (ISF) program in precision medicine grant 1778/20, “Inherited retinal diseases: from national-scale discovery of genes and risk factors to development of novel personalized therapeutics.” Joint with: Dror Sharon and Eyal Banin, Hadassah Medical Center, and Shay Ben-Aroya, Bar-Ilan University. 4,200,000₪.
- 2020-2024 Israel Ministry of Science and Technology, “Pharmacogenetic variants: from genotype frequencies to treatment response in high-burden diseases in Israel”. Joint with: Gad Rennert, Technion. 1,192,490₪.
- 2021-2025 National Human Genome Research Institute (NHGRI) of the National Institutes of Health (NIH) R01HG011711. “Embryo screening: towards informed decision-making”. Joint with: Todd Lencz, Northwell Health, and Gabriel Lazaro-Munoz, Baylor College of Medicine. \$775,642 (not final).

CONFERENCES

- 2004 Science of Complex Networks: from Biology to the Internet and WWW, Portugal (poster)
- 2005 Katzir Conference on Molecular Perspectives on Protein-Protein Interactions, Israel (poster)
- 2007 Complex Networks: from Biology to Information Technology, Italy (talk)
- 2011 Weak Chaos, Infinite Ergodic Theory, and Anomalous Dynamics, Germany (talk)
- 2012 The annual meeting of the American Society of Human Genetics, USA (poster)
- 2012 Personal Genomes and Medical Genomics, Cold Spring Harbor Laboratory, USA (talk)
- 2013 The annual meeting of the American Society of Human Genetics, USA (talk)
- 2014 Human Evolution in the Genomic Era: Origins, Populations, and Phenotypes, UK (talk)
- 2014 The Biology of Genomes, Cold Spring Harbor Laboratory, USA (poster)
- 2014 The annual meeting of the Society for Molecular Biology and Evolution, Puerto Rico (poster)
- 2014 The annual meeting of the American Society of Human Genetics, USA (poster)
- 2015 The Biology of Genomes, Cold Spring Harbor Laboratory, USA (poster)
- 2016 Understanding the Function of Human Genome Variation, Sweden (poster)

- 2016 Founder populations: Lessons from the Jewish Genome, Israel (talk)
- 2016 Probabilistic Modeling in Genomics, UK (talk)
- 2017 Revisiting the Question of Jewish Origins, USA (invited talk)
- 2017 Human Evolution: Fossils, Ancient and Modern Genomes, UK (talk)
- 2018 The Israel Statistical Association Annual Meeting, Israel (invited talk)
- 2018 Genomics – from disease prevention to treatment, Israel (invited talk)
- 2018 Genealogy and the Sciences, Israel (invited talk)
- 2019 The annual meeting of the American Society of Human Genetics, USA (talk)
- 2020 ILANIT/FISEB (Federation of the Israel Societies for Experimental Biology), Israel (invited talk)

WORKSHOPS

- 2006 Workshop on Networks and Complexity, Israel (talk)
- 2007 Adams fellowship annual poster session, the National Academy of Sciences, Israel
- 2008 Adams fellowship annual poster session, the National Academy of Sciences, Israel
- 2009 The Science of Complexity, Israel (talk)
- 2009 Bar-Ilan's Institute for Nanotechnology and Advanced Materials meeting, Israel (talk)
- 2010 The annual meeting of the Israel Physical Society, Israel (talk)
- 2014 Columbia University annual postdoc research symposium (poster; 4th prize)
- 2015 Columbia University Foundations of Data Science poster session
- 2015 Columbia University Data Science Institute Bi-Annual symposium poster session
- 2016 Israeli Bioinformatics Symposium (poster)
- 2018 HLA and KIR population dynamics, Israel (invited talk)
- 2018 Computational Genomics Summer Institute, UCLA, USA (invited talk)
- 2018 Workshop on "Jewish genes", The Hebrew University of Jerusalem, Israel (invited chair)
- 2019 Israel human population genetics meeting (keynote lecture)
- 2019 Innovations in Forensics and the Law, Israel (invited talk)
- 2019 Computational Genomics Summer Institute, UCLA, USA (invited talk)

SEMINAR TALKS

- 2007 The Center for Polymer Studies, Boston University
- 2008 The Center for Complex Network Research, Northeastern University
- 2009 The Center for Complex Network Research, Northeastern University
- 2010 IBM research center, Tel Aviv
- 2011 Department of Mathematics, Bar-Ilan University
- 2011 Department of Physics, Tel Aviv University
- 2012 Faculty of Life Sciences, Bar-Ilan University
- 2012 School of Computer Science, Tel-Aviv University
- 2013 School of Computer Science, Tel-Aviv University
- 2013 Broad Institute
- 2013 Department of Genetics, Harvard Medical School
- 2013 Department of Computer Science, Columbia University
- 2014 Division of Psychiatric Genomics, Icahn School of Medicine at Mount Sinai
- 2014 Department of Organismic and Evolutionary Biology, Harvard University
- 2014 Computational Biology and Bioinformatics, University of Southern California
- 2014 Department of Computer Science, University of California, Los Angeles
- 2014 Sackler Faculty of Medicine, Tel-Aviv University
- 2015 Department of Biological Statistics and Computational Biology, Cornell University
- 2015 Department of Genetics, The Faculty of Medicine, The Hebrew University of Jerusalem

2015 Department of Human Genetics and Metabolic Diseases, Hadassah Medical Center
 2015 School of Computer Science and Engineering, The Hebrew University of Jerusalem
 2015 Institute of Genetics, Shaare Zedek Medical Center
 2017 Faculty of Mathematics and Computer Science, Weizmann Institute of Science
 2018 Cancer Research Hub, The Faculty of Medicine, The Hebrew University of Jerusalem
 2018 Faculty of Mathematics and Computer Science, Weizmann Institute of Science
 2018 Department of Archaeogenetics, Max Planck Institute for the Science of Human History
 2018 Institute of Genetics, Ha'Emek Medical Center
 2018 School of Public Health, The Hebrew University of Jerusalem
 2019 Department of Molecular Genetics, Weizmann Institute of Science
 2019 Max Planck Institute for the Science of Evolutionary Biology
 2019 Faculty of Mathematics and Computer Science, Weizmann Institute of Science
 2019 The Faculty of Medicine (2x), The Hebrew University of Jerusalem
 2020 Hadassah Medical Center clinical presentation
 2020 Faculty lecture, Faculty of Medicine, The Hebrew University of Jerusalem
 2020 Cardiology, Hadassah Medical Center
 2020 Department of Genetics, Harvard Medical School
 2020 Program in Quantitative Genomics, Harvard T.H. Chan School of Public Health
 2020 Computational Data Science, Technion

PEER REVIEW

2008- An independent reviewer for:
Interdisciplinary: Science, Nature Communications, PLOS One, Scientific Reports
Biomedical sciences: Nature Genetics, eLife, American Journal of Human Genetics, Genome Biology, Genetics, Genetics in Medicine, Molecular Biology and Evolution, PLOS Genetics, PLOS Computational Biology, Theoretical Population Biology, RECOMB, BMC Bioinformatics, Human Genetics, Human Reproduction, Clinical and Translational Medicine, Genes, Frontiers in Genetics, Journal of Personalized Medicine, Israel Journal of Health Policy Research, Molecular Biotechnology
Physics: Physical Review Letters, Physical Review E, Europhysics Letters, New Journal of Physics, Journal of Statistical Mechanics, Physics Letters A, Journal of Physics A, Physica A, ESAIM: Mathematical Modelling and Numerical Analysis, Canadian Journal of Physics
Other: Journal of Anthropological Research
 2008 Selected as a Europhysics Letters distinguished referee.
 2016- Grant reviewer for:
 The Wellcome Trust, German-Israeli Foundation for Scientific Research and Development (GIF), Israel Science Foundation (ISF)

OTHER PROFESSIONAL SERVICE

University committees:

2016- Research committee, The Faculty of Medicine (HUJI)
 2017- Advanced studies committee, The Faculty of Medicine (HUJI)
 2016- PhD committee, Braun School of Public Health (HUJI)

Other university service:

2016-2017, 2018-2019 School seminar coordinator, Braun School of Public Health (HUJI)

PhD committees:

2016- Lily Agranat-Tamir, Life Sciences and Statistics (HUJI)

2019- Shoshana Revel-Vilk, Braun School of Public Health (HUJI)
 2021- Sapir Labes, Faculty of Medicine (HUJI)
 2021- Shany Derhy, Faculty of Medicine, the Technion

PhD thesis reading:

2017 Samantha Streicher, Yale School of Public Health

MSc/MPH thesis reading:

2017 Reshit Beizer, Public Health (HUJI)
 2018 Nechama Averick, Public Health (HUJI)
 2019 Itay Nitzan, Public Health (HUJI)
 2019 Gabriel Azhari, Engineering, Bar-Ilan University
 2021 Rachel Michaelson-Cohen (HUJI)

PhD defense committee:

2020 Mor Hanani, Hadassah Medical Center

National committees:

2020 Council for Higher Education data science fellowship

Consulting (non-profit):

2017-2018 Israel Ministry of Health national precision medicine initiative (PSIFAS)
 2019 Israel Science Foundation
 2019-2020 Israel Ministry of Justice
 2019- Clalit Health Services

Consulting (industry):

2016- My Heritage

Memberships in societies:

2010-2011 Israel Physical Society
 2012-2014, 2019 The American Society of Human Genetics
 2014 The Society for Molecular Biology and Evolution

STUDENTS SUPERVISED

Post-docs

2020- Daniel Backenroth (part time)
 2016-2018 Shay Tzur (part time)
 2016 Avner Halevy (part time)
 2019 Einat Granot-Hershkovitz

PhD students

2016- Shamam Waldman
 2017-2021 Hila Fridman (joint with Ephrat Levy-Lahad, Shaare Zedek Medical Center)
 2019- Idit Tessler (joint with Ronen Durst and Dan Gilon, Hadassah Medical Center)

Master's students

2020- Daria Triffon (joint with Itay Chowers, Hadassah Medical Center)
 2020- Johanna Valensi (joint with Dror Sharon, Hadassah Medical Center)
 2017-2019 Idit Lozowick-Gabay (joint with Ronen Durst and Dan Gilon, Hadassah Medical Center; rector's list)
 2017-2019 Ehud Karavani
 2016-2018 David Raveh-Brawer (faculty's excellent thesis award, graduated magna cum laude)

Undergraduate research projects and research interns

2020- Guy Mizrachi
 Biomedical sciences (HUJI)
 Developing computational methods for preimplantation genetic testing
 2020- Dana Golan

- 2018-2019 Biomedical sciences (HUJI)
Clinical utility of polygenic scores
Roei Levy
Public health (HUJI)
- 2019- Inference of sex-specific founder events with X-linked IBD sharing
Saar Armon
Biomedical sciences (HUJI)
- 2016- Algorithms for variant calling from low coverage sequencing data
Kobi Landau
Medicine (HUJI), MD thesis
- 2018-2019 Computational methods for studying the male germline cell lineage
Itamar Medved
Biomedical sciences (HUJI)
- 2016-2017 Demographic inference based on multiway haplotype sharing
Or Yaacov
Medicine (HUJI)
- 2016 Searching for genes associated with lipid levels in a large pedigree from Israel
Dana Baril
Computer Science (HUJI)
- 2015-2016 Coalescence times in large-scale genealogical records
Noam Bar
Computer Science and Computational Biology (HUJI)
- 2015-2016 Imputation of missing variants for ultra-low coverage sequencing in Ashkenazi Jews
Gavriel Fialkoff
Computer Science and Computational Biology (HUJI)
- 2016 Detection of copy number variants for preimplantation genetic screening with low-coverage single cell embryonic sequencing
Adina Barchichat
Bioinformatics, Jerusalem College of Bioinformatics
IBD mapping on the X chromosome

STUDENT PROJECTS SUPERVISED (BEFORE HUJI)

Undergraduate computational biology research projects at Bar-Ilan University

- 2010 Structural motifs in transcripts regulated under splicing factors depletion in *Trypanosoma brucei* (Or Garfunkel and Roy Azran)
- 2011 DNA editing in polymorphic human retrotransposons (Anastasia Shapiro)
- 2011 A comprehensive screen for DNA editing in mammalian genomes (Binyamin Knisbacher)

Undergraduate/masters research projects at Columbia University

- 2012 Quality control and variant statistics in the genomes of Ashkenazi Jews (Fillan Grady)
- 2012 Imputation of Ashkenazi Jewish genomes using whole genome sequencing panels (Ethan Kochav)
- 2012 Evaluating methods of local ancestry inference in closely related populations (James Xue)
- 2013 Coverage of Ashkenazi Jewish genomes by long segments shared with a reference panel (James Xue)
- 2014 Extracting IBD segments efficiently from genealogical trees (Shuo Yang)
- 2015 Refining the parameters of the bottleneck in the Ashkenazi Jewish population history (Hannah Rosenwein)