

Curriculum Vitae

Gabriel Etan Leventhal

MIT 48-216ga, 15 Vassar St
Cambridge, MA 02139
U.S.A.

Phone: +1 (202) 374-9514
Email: gaberoo@mit.edu
URL: <http://www.leventhal.ch>

Language Skills: English (native), Swiss German (native), German (fluent), French (fluent)

Current Position

Nov 2015 – present **Postdoctoral Fellow, Massachusetts Institute of Technology (MIT), U.S.A.**
Cordero Lab, Department of Civil and Environmental Engineering

Areas of Specialization

Microbial Ecosystems; Evolutionary Theory; Interaction Networks; Community Evolution; Evolutionary Ecology; Computational Biology; Phylogenetics; Statistical Inference; Ecological Networks; Epidemiology; HIV Dynamics

Academic Positions and Education

Sep 2014 – Oct 2015 **Postdoctoral Researcher, ETH Zürich, Switzerland**
Theoretical Biology Group, Institute of Integrative Biology

Sep 2009 – Aug 2014 **PhD Thesis, ETH Zürich, Switzerland**
Title: Modeling the ecology and evolution of infectious diseases
Supervisor: Prof. Sebastian Bonhoeffer

Mar 2008 – Jun 2008 **Research Assistant, EPFL, Lausanne, Switzerland**
Laboratory of Statistical Biophysics, Department of Physics

Oct 2006 – Feb 2008 **MSc in Physics, EPFL, Lausanne, Switzerland**

Aug 2007 – Feb 2008 **Master's Thesis, Indiana University Bloomington, U.S.A.**
Title: Spectral Coarse Graining in Ising Spin Systems
Supervisors: Prof. Alessandro Flammini (IUB) and Prof. Paolo De Los Rios (EPFL)

May 2006 – Aug 2006 **Research Assistant, Hong Kong University of Science and Technology**
Kwok Yip Szeto Group, Department of Physics

Aug 2002 – May 2006 **BSc in Physics, EPFL, Lausanne, Switzerland**

Sep 2005 – May 2006 **Undergraduate Exchange, Hong Kong University of Science and Technology**
One-year international exchange program as part of BSc in physics

Publications

I have published 21 original research articles in peer-reviewed journals (10 as first, co-first, or equal contribution, as well as 2 review articles).

† equal contribution; * student advisee

Microbial Ecology & Evolution

- preprint LS Bittleston, M Gralka, **GE Leventhal**, I Mizrahi, OX Cordero. *Context-dependent dynamics lead to the assembly of functionally distinct pitcher-plant microbiomes*. **bioRxiv** 10.1101/727701
- 2019 **GE Leventhal**, M Ackermann, K Schiessl. *Why microbes secrete molecules to modify their environment: the case of iron-chelating siderophores*. **Journal of the Royal Society Interface** 16(150):10.1098/rsif.2018.0674
- 2018 **GE Leventhal**, C Boix*, U Kuechler, T Enke, E Sliwerska, C Holliger, OX Cordero. *Strain-level diversity drives alternative community types in millimetre-scale granular biofilms*. **Nature Microbiology** 3:1295–1303 10.1038/s41564-018-0242-3
- 2018 TN Enke, **GE Leventhal**, M Metzger, J Saavedra, OX Cordero. *Microscale ecology regulates particulate organic matter turnover in model marine microbial communities*. **Nature Communications** 10.1038/s41467-018-05159-8
- preprint **GE Leventhal**†, L Wang†, RD Kouyos. *Real-world Interaction Networks Buffer Impact of Small Evolutionary Shifts On Biodiversity*. **bioRxiv** 10.1101/013086

Microbiome & Health

- 2019 MR Spalinger, M Schwarzfischer, L Hering, A Shawki, A Sayoc, A Santos, C Gottier, S Lang, K Bähler, A Geirnaert, C Lacroix, **GE Leventhal**, X Dai, D Rawlings, AA Chan, G Rogler, DF McCole, M Scharl. *Loss of PTPN22 abrogates the beneficial effect of cohousing-mediated fecal microbiota transfer in murine colitis*. **Mucosal Immunology** 10.1038/s41385-019-0201-1

Pathogen Evolution

- 2017 F Bertels, A Marzel, **GE Leventhal**, V Mitov, J Fellay, HF Günthard, J Böni, S Yerly, T Klimkait, V Aubert, M Battegay, A Rauch, M Cavassini, A Calmy, E Bernasconi, P Schmid, A Scherrer, V Müller, S Bonhoeffer, RD Kouyos, RR Regoes. *Dissecting HIV Virulence: Heritability Of Setpoint Viral Load, CD4+ T Cell Decline And Per-Parasite Pathogenicity*. **Molecular Biology and Evolution** 35(1):27–37 10.1093/molbev/msx246
- 2017 N Bachmann, T Turk, C Kadelka, A Marzel, M Shilaih, J Böni, V Aubert, T Klimkait, **GE Leventhal**, HF Günthard, RD Kouyos. *Parent-offspring regression to estimate the heritability of an HIV-1 trait in a realistic setup*. **Retrovirology** 14(33) 10.1186/s12977-017-0356-3
- 2016 **GE Leventhal**, S Bonhoeffer. *Potential pitfalls in estimating viral load heritability*. **Trends in Microbiology** 24(9):687–698 10.1016/j.tim.2016.04.008
- 2015 S Bonhoeffer, C Fraser, **GE Leventhal**. *Heritability and the distribution of set point viral load in HIV carriers*. **PLoS Pathogens** 11(2):e1004634 10.1371/journal.ppat.1004634
- 2014 C Fraser, K Lythgoe, **GE Leventhal**, G Shirreff, TD Hollingsworth, S Alizon, S Bonhoeffer. *Virulence and Pathogenesis of HIV-1 Infection: An Evolutionary Perspective*. **Science** 343(6177):1243727 10.1126/science.1243727
- 2014 **GE Leventhal**†, SR Dünner†*, S Barribeau. *Delayed virulence and limited costs promote fecundity compensation upon infection*. **American Naturalist** 103(4):480–493 10.1086/675242
- 2013 A Hool†*, **GE Leventhal**†, S Bonhoeffer. *Virus-induced target cell activation reconciles set-point viral load heritability and within-host evolution*. **Epidemics** 7:35–35 10.1016/j.epidem.2013.09.002
- 2012 RD Kouyos, **GE Leventhal**, T Hinkley, M Haddad, J Whitcomb, C Petropoulos, S Bonhoeffer. *Exploring the Complexity of the HIV-1 Fitness Landscape*. **PLoS Genetics** 8(3):e1002551 10.1371/journal.pgen.1002551

Network Epidemiology

- 2017 JI Liechti, **GE Leventhal**, S Bonhoeffer. *Host population structure impedes reversion to drug sensitivity after discontinuation of treatment*. **PLoS Computational Biology** 13(8):e1005704 10.1371/journal.pcbi.1005704
- 2016 W Delva, **GE Leventhal**, S HELLINGER. *Connecting the dots: network data and models in HIV epidemiology*. **AIDS** 30(13):2009–2020 10.1097/QAD.0000000000001184
- 2015 **GE Leventhal**[†], AL Hill[†], M Nowak, S Bonhoeffer. *Evolution and emergence of infectious diseases in theoretical and real-world networks*. **Nature Communications** 6 10.1038/ncomms7101
- 2012 **GE Leventhal**, RD Kouyos, T Stadler, VV Wyl, S Yerly, J Böni, C Celleraï, T Klimkait, HF Günthard, S Bonhoeffer. *Inferring Epidemic Contact Structure from Phylogenetic Trees*. **PLoS Computational Biology** 8(3):e1002413 10.1371/journal.pcbi.1002413

Mathematical Modelling & Statistical Inference

- 2019 TG Vaughan[†], **GE Leventhal**[†], DA Rasmussen, AJ Drummond, D Welch, T Stadler. *Estimating epidemic incidence and prevalence from genomic data*. **Molecular Biology and Evolution** 36(8):1804–1816 10.1093/molbev/msz106
- 2017 O Ratmann, EB Hodcroft, M Pickles, A Cori, M Hall, S Lycett, C Colijn, B Dearlove, X Didelot, S Frost, A Hossain, JB Joy, M Kendall, D Kühnert, **GE Leventhal**, R Liang, G Plazotta, AF Poon, DA Rasmussen, T Stadler, E Volz, C Weis, AJ Leigh Brown, C Fraser. *Phylogenetic Tools for Generalized HIV-1 Epidemics: Findings from the PANGEA-HIV Methods Comparison*. **Molecular Biology and Evolution** 34(1):185–203 10.1093/molbev/msw217
- 2016 L du Plessis, **GE Leventhal**, S Bonhoeffer. *How good are statistical models at approximating complex fitness landscapes?*. **Molecular Biology and Evolution** 33(9):2454–2468 10.1093/molbev/msw097
- 2015 T Stadler, TG Vaughan, A Gavryushkin, S Guindon, D Kühnert, **GE Leventhal**, AJ Drummond. *How well can the exponential-growth coalescent approximate constant-rate birth–death population dynamics?*. **Proceeding of the Royal Society B: Biological Sciences** 282(1806):20150420 10.1098/rspb.2015.0420
- 2014 **GE Leventhal**, H Günthard, S Bonhoeffer, T Stadler. *Using an epidemiological model for phylogenetic inference reveals density-dependence in HIV transmission*. **Molecular Biology and Evolution** 31(1):6–17 10.1093/molbev/mst172

Software & Other Publications

- 2013–2016 **GE Leventhal**. *R package expoTree to calculate the density dependent likelihood of a phylogenetic tree*. Available on CRAN..
- 2012–2019 **GE Leventhal**, L Schulé, J Geering. *iRiSS: a free online journal TOC aggregator that helps you stay informed about the latest work produced in your field*.

Teaching and Mentoring

- 2016, 2018 Co-Instructor, Computational Ecology . MIT, Cambridge, MA, USA
- 2018 Co-Supervisor, Exchange graduate student (Jacob Russel) . MIT, Cambridge, MA, USA
- 2016 Co-Supervisor, Rotation student (Carles Boix) . MIT, Cambridge, MA, USA
- 2013 – 2015 Co-Lecturer, Infectious Disease Dynamics . ETH Zürich, Switzerland
- 2015 Co-Supervisor, Master's thesis (Adriano Pagano) . ETH Zürich, Switzerland
- 2015 Supervisor, Semester student (Adriano Pagano) . ETH Zürich, Switzerland
- 2015 Co-Supervisor, Master's thesis (Martin Müller) . ETH Zürich, Switzerland
- 2012 Co-Supervisor, Master's thesis (Anna Hool) . ETH Zürich, Switzerland
- 2012 Co-Supervisor, Semester student (Robert Dünner) . ETH Zürich, Switzerland
- 2011 – 2012 Co-Lecturer, English for nurses: an introduction to academic reading . Zurich University of Applied Sciences, Switzerland
- 2007 – 2008 Tutor for undergraduate calculus. Indiana University Bloomington, IN, U.S.A.
- 2005 – 2007 Teaching assistant in physics. EPFL, Lausanne, Switzerland
- 2003 – 2004 Teaching assistant in scientific programming. EPFL, Lausanne, Switzerland

Selected presentations

- Jul 2019 ETH Zurich Food Biotechnology Seminar (talk) Zurich, Switzerland
- Feb 2019 University of Minnesota Seminar (talk) St. Paul, MN, USA
- Aug 2018 Penn State Microbiome Center Seminar (talk) State College, PA, USA
- Aug 2018 ISME Conference (talk) Leipzig, Germany
- Jul 2018 HFSP Fellows Meeting 2018 (poster) Toronto, Canada
- Jun 2018 International Sourdough Symposium (poster) Cork, Ireland
- Jun 2018 NYU Genomics Symposium (talk) New York, NY, USA
- Jan 2018 MIT Ecology Meeting (talk) Cambridge, MA, USA
- Nov 2017 Workshop, Symbiosis in the microbial world: from ecology to genome evolution)(talk) West Sussex, UK
- Jul 2017 Gordon Research Conference: Microbial Population Biology (poster) Andover, NH, USA
- Jul 2017 Gordon Research Seminar: Microbial Population Biology (talk) Andover, NH, USA
- Mar 2017 Winter q-Bio Conference (talk) Kauai, HI, USA
- Oct 2016 Weizman Genome Evolution Conference (talk) Rehovot, Israel
- Aug 2016 ISME Conference (poster) Montreal, Canada
- Aug 2015 ESEB Conference (talk) Lausanne, Switzerland
- Jul 2015 SMBE Conference (poster) Vienna, Austria
- May 2015 HIV Dynamics and Evolution Conference (talk) Budapest, Hungary
- Feb 2014 New Zealand Phylodynamics Meeting (talk) Waiheke, New Zealand
- Nov 2013 Epidemics Conference (poster) Amsterdam, Netherlands
- May 2013 MCBE Conference (poster) Montpellier, France
- May 2013 HIV Dynamics and Evolution Conference (poster) Utrecht, Netherlands
- Jul 2012 Gordon Research Conference: Drug Resistance Evolution (poster) Easton, MA, USA
- Jan 2012 EE2 Workshop: Facing the challenge of infectious diseases (poster) Aosta, Italy
- Jul 2011 Gordon Research Conference: Microbial Population Biology (poster) Andover, NH, USA
- Nov 2011 EAWAG Aquatic Ecology and Macroevolution Seminar (talk) Kastanienbaum, Switzerland

Other Academic Activities

Grant Referee

Swiss National Science Foundation

Journal Referee

eLIFE; PNAS; Ecology Letters; Environmental Microbiology; Communications Biology; Proceedings of the Royal Society B; The American Naturalist; PLoS Computational Biology; Molecular Biology and Evolution; Journal of the Royal Society Interface; mSystems; Bioinformatics; Epidemics; Journal of Theoretical Biology; Theoretical Population Biology; Journal of Acq. Immune Deficiency Syndromes; Scientific Reports; PLoS ONE; Applied Mathematics and Computation; International Health

Seminar Organizing Committee

Parson's Microbial Systems Seminar, Massachusetts Institute of Technology
Ecology, Evolution, Environment, Behavior (E3B) Seminar, University of Zurich/ETH Zurich
Zurich Interaction Seminar, University of Zurich/ETH Zurich

Other activities

Maintainer at Brewsci/bio. Bioinformatics formulae for the Linuxbrew and Homebrew package managers.. <https://brewsci.github.io/homebrew-bio/>

References

Prof. Otto Cordero, Massachusetts Institute of Technology, ottox@mit.edu
Prof. Sebastian Bonhoeffer, ETH Zurich, seb@env.ethz.ch
Prof. Christophe Fraser, University of Oxford, christophe.fraser@bdi.ox.ac.uk