Curriculum Vitae

Gabriel Etan Leventhal

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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 22 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

2020 LS Bittleston, M Gralka, **GE Leventhal**, I Mizrahi, OX Cordero. *Context-dependent dynamics lead to the assembly of functionally distinct pitcher-plant microbiomes.* **Accepted pending final revisions at Nature Communications.** 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

preprint E Katkeviciute, L Hering,, A Montalban-Arques, P Busenhart, JC Aranda, K Atrott, S Lang, G Rogler, E Naschberger, VS Schellerer, M Stürzl, A Rickenbacher, M Turina, A Weber, S Leibl, **GE Leventhal**, M Levesque, O Boyman, M Scharl, MR Spalinger. *Targeting protein tyrosine phosphatase non-receptor type 2 in immune cells converts immune-silent into highly immunogenic tumors.* **Submitted**

2019 MR Spalinger, M Schwarzfischer, L Hering, A Shawki, A Sayoc, A Santos, C Gottier, S Lang, K Bäbler, 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 Helleringer. *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 Cellerai, 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 Plazzotta, 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 Univeristy 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 Acadmic 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 Soceity 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