

Curriculum vitae: Dr. Benjamin C. HALLER

Evolutionary Biologist and Senior Software Engineer

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Citizenship: U.S.

Academic History (Selected)

Research Programmer/Analyst, November 2014 – present

Cornell University, Philipp Messer Lab (Ithaca, NY)

I work with Philipp Messer on an individual-based evolutionary simulation framework, SLiM, written in C++ and Objective-C, published as open source on GitHub. As a part of this work, I have developed and implemented a new scripting language, Eidos, used to control SLiM.

Postdoctoral Researcher with Luis-Miguel Chevin, November 2013 – April 2014

CEFE (Centre d'Ecologie Fonctionnelle & Evolutive), CNRS (Montpellier, France)

I investigated questions regarding the effects of temporal environmental variation on adaptive evolution and the detection of directional selection in simulated populations.

Ph.D., Biology (Evolutionary), with Andrew Hendry, September 2009 – June 2013

McGill University (Montreal, Quebec, Canada)

My thesis, "The role of heterogeneity in adaptation and speciation", used individual-based modeling to investigate the interaction between spatial heterogeneity, gene flow, and local adaptation, and how these factors affect the process of ecological speciation.

B.S., Biology (Conservation / Organismal), January 2005 – May 2009

San Jose State University (San Jose, California)

4.00 GPA, 4.0 basis. Magna Cum Laude and "Outstanding Graduating Senior" (see Honors).

Non-Academic Employment (Selected)

Senior Software Engineer, July 1996 – May 2001

Apple / NeXT (Cupertino, California)

On a small team writing a user-level application for the creation of dynamic HTML content. Involved Objective-C, Cocoa, HTML 3.2 and 4.0, CSS, and EOF. Responsibilities included the HTML editing engine, user interface design and coding, architectural work, and optimization.

Software Engineer, July 1990 – September 1992

Berkeley Systems (Berkeley, California)

Wrote screensaver modules for the best-selling After Dark package (Satori, Rose, and Lunatic Fringe, among others). Wrote a PostScript-compatible renderer and did user interface design and implementation for an unreleased collaborative desktop publishing application.

Jack-of-all-trades, June 1989 – present

Stick Software

I run my own software company, Stick Software (<http://www.sticksoftware.com>), with shareware and freeware for the Macintosh. Products include Solarian II, an award-winning video game; Fracture, a fractal screensaver; and PhotoReviewer, a digital photography utility (4.5 mice from MacWorld).

Awards, Honors & Grants

- 2010–2013: National Science Foundation (NSF) Graduate Research Fellowship (GRF) recipient. \$127,500 total, over three years, covering stipend and tuition. Grant #1038597.
- 2012: Delise Allison award from the Redpath Museum (McGill University). \$500.
- 2012: Research Travel Award from McGill University. \$1300.
- 2011: International Travel Award from the Society for the Study of Evolution. \$1000.
- 2011: Graduate Research Enhancement and Travel (GREAT) Award, from McGill University. \$500.
- 2011: GRF Travel Allowance, from the National Science Foundation (NSF). \$1000.
- 2010: Nominee, Peccei & Mikhalevich Scholarships for outstanding participants in the International Institute for Applied Systems Analysis (IIASA) Young Scientists Summer Program.
- 2010: National Academy of Sciences (NAS) travel grant. \$7500.
- 2009: Provost's Graduate Fellowship, McGill University. \$5000.
- 2009: Principal's Graduate Fellowship, McGill University. \$2500.
- 2009: Outstanding Graduating Senior, San Jose State University. One of two such awards for 2009, for all of San Jose State University (~6,000 student graduating class). \$300.
- 2008: Alan and Karin Nelson Scholarship, Dept. of Biology, San Jose State University. \$800.
- 2007–2009: President's Scholar, San Jose State University (five semesters total).
- 2006: Dean's Scholar, San Jose State University (two semesters total).

Publications

Peer-reviewed

- B.C. Haller**, P.W. Messer. (2017). asymptoticMK: A web-based tool for the asymptotic McDonald–Kreitman test. *G3: Genes, Genomes, Genetics* 7(5), 1569–1575. [DOI](#).
- B.C. Haller**, P.W. Messer. (2017). SLiM 2: Flexible, interactive forward genetic simulations. *Molecular Biology and Evolution* 34(1), 230–240. [DOI](#).
- L.-M. Chevin, **B.C. Haller**. (2014). The temporal distribution of directional gradients under selection for an optimum. *Evolution* 68(12), 3381–3394. [DOI](#).
- B.C. Haller**, J.M. de Vos, B. Keller, A.P. Hendry, E. Conti. (2014). A tale of two morphs: Modeling pollen transfer, magic traits, and reproductive isolation in parapatry. *PLoS ONE* 9(9), e106512. [DOI](#).
- B.C. Haller**. (2014). Theoretical and empirical perspectives in ecology and evolution: A survey. *BioScience* 64(10), 907–916. [DOI](#).
- M.D. Nowak, **B.C. Haller**, A.D. Yoder. (2014). The founding of Mauritian endemic coffee trees by a synchronous long-distance dispersal event. *Journal of Evolutionary Biology* 27(6), 1229–1239. [DOI](#).
- B.C. Haller**, A.P. Hendry. (2013). Solving the paradox of stasis: Squashed stabilizing selection and the limits of detection. *Evolution* 68(2), 483–500. [DOI](#). Recommended by [Faculty of 1000](#).
- B.C. Haller**, R. Mazzucco, U. Dieckmann. (2013). Evolutionary branching in complex landscapes. *American Naturalist* 182(4), E128–E141. [DOI](#).
- B.C. Haller**, L.F. De Léon, G. Rolshausen, K.M. Gotanda, A.P. Hendry. (2012). Magic traits: distinguishing the important from the trivial [letter]. *Trends in Ecology and Evolution* 27(1), 4–5. [DOI](#).
- M. Tum, M. Buchhorn, K.P. Günther, **B.C. Haller**. (2011). Validation of modelled forest biomass in Germany using BETHY/DLR. *Geoscientific Model Development* 4, 1019–1034. [DOI](#).
- E. Crispo, J.-S. Moore, J. Lee-Yaw, S.M. Gray, **B.C. Haller**. (2011). Human impacts on gene flow and introgression and the consequences for biodiversity. *BioEssays* 33(7), 508–518. [DOI](#).

- B.C. Haller**, D. Chambers, R. Cheng, V. Chemistruck, T.F. Hom, Z. Li, J. Nguyen, A. Ichimura, D.J.R. Brook. (2015). Oxidation of electron donor-substituted verdazyls: Building blocks for molecular switches. *Journal of Physical Chemistry A* 119(43), 10750–10760. [DOI](#).
- D.J.R. Brook, C.J. Richardson, **B.C. Haller**, M. Hundley, G.T. Yee. (2010). Strong ferromagnetic metal-ligand exchange in a nickel bis(3,5-dipyridylverdazyl) complex. *Chemical Communications* 46(35), 6590–6592. [DOI](#).

Not peer-reviewed

Regular contributor to (and maintainer of) the Hendry Lab blog, ecoevoeco.blogspot.ca.

- B.C. Haller**. (2012). Programming in R [workshop]. <http://biology.mcgill.ca/grad/ben/progInR.html>.
- E. Meir, **B.C. Haller**. (1991). Fractal Mountain Climbing. *MacTutor* 7(5).

Presentations

Invited talks

- B.C. Haller**. 2013. The role of heterogeneity in adaptation and speciation. *ISEM (Institut des Sciences de L'Evolution de Montpellier)*, Université Montpellier 2. Montpellier, France.
- B.C. Haller**. 2013. The role of heterogeneity in adaptation and speciation. *CEFE (Centre d'Ecologie Fonctionnelle & Evolutive)*, Centre National de la Recherche Scientifique. Montpellier, France.
- B.C. Haller**. 2013. The role of heterogeneity in adaptation and speciation. *UQÁM (Université du Québec à Montréal)*. Montreal, Québec, Canada.
- B.C. Haller**, A. Hendry. 2013. Solving the paradox of stasis: Stabilizing selection and the limits of detection. *INDICASAT (Instituto de Investigaciones Científicas y Servicios de Alta Tecnología)*. Clayton, Panamá.
- B.C. Haller**, R. Mazzucco, U. Dieckmann. 2011. Speciation in complex habitats. *EAWAG (Swiss Federal Institute of Aquatic Science and Technology)*. Dübendorf, Switzerland.
- B.C. Haller**, R. Mazzucco, U. Dieckmann. 2010. Speciation in complex habitats. *Institute of Systematic Botany, University of Zürich*. Zürich, Switzerland.

Contributed talks

- B.C. Haller**, P.W. Messer. 2016. SLiM 2.0: Flexible, interactive forward genetic simulations. *CSEE 2016 (Canadian Society for Ecology & Evolution)*. St. John's, Newfoundland, Canada.
- B.C. Haller**, P.W. Messer. 2016. SLiM 2.0: Flexible, interactive forward genetic simulations [Regular talk, lightning talk, and software demo]. *Evolution 2016 (SSE/SSB/ASN annual conference)*. Austin, Texas, U.S.A.
- B.C. Haller**, J. M. de Vos, B. Keller, E. Conti. 2011. Pollinator-driven speciation in heterostylous plants: an individual-based model incorporating floral morphology, pollinator traits, and spatial effects. *Evolution 2013 (SSE/SSB/ASN annual conference)*. Snowbird, Utah, U.S.A.
- B.C. Haller**. 2013. The role of heterogeneity in adaptation and speciation. *Ecology & Evolution Lunch Seminar Series, McGill University*. Montreal, Québec, Canada.
- B.C. Haller**, A. Hendry. 2012. Solving the Paradox of Stasis: Stabilizing selection and the limits of detection. *Evolution 2012 (SSE/SSB/ASN/ESEB/CSEE annual conference)*. Ottawa, Canada.
- B.C. Haller**, A. Hendry. 2012. Stabilizing selection and the paradox of stasis. *Redpath Museum Seminar Series, McGill University*. Montreal, Québec, Canada.
- B.C. Haller**, R. Mazzucco, U. Dieckmann. 2011. Speciation in complex habitats. *Niche Theory and Speciation Workshop 2011*. Lake Balaton, Hungary.
- B.C. Haller**, J. M. de Vos, B. Keller, E. Conti. 2011. Pollinator-driven diversification in heterostylous plants: an individual-based model. *European Society for Evolutionary Biology (ESEB) 2011*. Tübingen, Germany.

- B.C. Haller**, R. Mazzucco, U. Dieckmann. 2010. Speciation in complex habitats. *Speciation 2010: First European Conference on Speciation Research*. Laxenburg, Austria.
- B.C. Haller**, R. Mazzucco, U. Dieckmann. 2010. Speciation in complex habitats. *Québec Centre for Biodiversity Science (QCBS) Annual Conference*. Montréal, Canada.
- B.C. Haller**, A. Hendry. 2010. Dispersal and speciation: An individual-based approach. *Biology Graduate Student Symposium (BGSS), McGill University*. Montréal, Québec, Canada.
- B.C. Haller**, A. Hendry. 2010. Computational modeling to better understand adaptation and speciation. *Interdisciplinary Graduate Student Research Symposium (IGSRS)*. McGill University.
- B.C. Haller**, P. Yav, M. Lum, M. Kress, P. Matheus, L. Hernandez, S. Rech, E. Bryant, M. Harker. 2008. Exploration of the Mojave Desert as a component of an advanced astrobiology course for science majors. *AbSciCon (Astrobiology Science Conference) 2008*. Santa Clara, California.

Poster presentations

- B.C. Haller**, J. M. de Vos, B. Keller, A. P. Hendry, E. Conti. 2014. A tale of two morphs: Modeling pollen transfer, magic traits, and reproductive isolation in heterostyly. *Radiations 2014 (Evolutionary Plant Radiations: Where, When, Why, How?)*. Zürich, Switzerland.
- B.C. Haller**, R. Mazzucco, U. Dieckmann. 2012. Speciation in complex habitats. *Centre for Applied Mathematics in Bioscience and Medicine (CAMBAM), 2012 Annual Meeting*. McGill University.
- D.J.R. Brook, C. Richardson, **B.C. Haller**. 2011. Transition metal complexes of a new verdazyl analog of terpyridine. *241st National Meeting of the American Chemical Society (ACS)*.
- B.C. Haller**, R. Mazzucco, U. Dieckmann. 2011. Speciation in complex habitats. *Canadian Society for Ecology & Evolution (CSEE), 2011 Annual Meeting*. Banff, Canada.
- C. Richardson, **B.C. Haller**, D.J.R. Brook. 2009. Synthesis of a verdazyl analog of terpyridine. *Annual Biomedical Research Conference for Minority Students (ABRCMS)*.
- D. Barton, S. Smits, **B.C. Haller**, J. Dinis, H. Gavrilova, C. Ouverney. 2009. Uncultivated environmental prokaryotic model to study human disease-associated bacteria. *Northern California Branch, American Society for Microbiology (NCASM)*.

Teaching & Supervision

- 2013: Supervisor and mentor of an undergraduate student, Serena McDonnell, in her McGill University research project, "Graphical Depictions of Evolutionary Processes".
- 2012: Developed and taught a workshop at McGill University on Programming in R. Slides and R scripts are available at <http://biology.mcgill.ca/grad/ben/progInR.html>.
- 2008: Developed a website learning resource for BOT 165: Plant Communities of California, a class at SJSU, while an undergraduate in the class: <http://www.cloudphotographic.com/bot165/>.
- 2007–2008: Worked as a chemistry workshop facilitator for the AMP (Alliance for Minority Participation) program run by Dr. Karen Singmaster at San Jose State University. Designed worksheets, ran workshops, tutored students, and lectured on general and organic chemistry.

Outreach & Service

- Manuscript reviewer for *Evolution*, the *Journal of Evolutionary Biology*, and the *American Naturalist*
- Grant proposal reviewer for the Austrian Science Fund
- 2009–2017: Launched, maintained, and contributed to the Hendry Lab's blog on eco-evolutionary dynamics, ecoevoevoeco.blogspot.ca, which has received over 600,000 views.
- 2012–2013: Councilor in the McGill Biology Graduate Students Association (BGSA).
- 2012–2013: Solicited and organized visits to McGill by Dr. Michael Doebeli (U. of British Columbia), Dr. Sally Otto (U. of British Columbia), and Dr. Mark Lewis (U. of Alberta).

- 2012: Organized a full-day workshop given by Dr. Sally Otto (U. of British Columbia) at McGill University. The workshop, on mathematical modeling in ecology and evolution, was sponsored by the Quebec Centre for Biodiversity Science and had 46 attendees.
- 2012: Assisted in a public outreach event for the Canadian Society for Ecology and Evolution at the Canadian Museum of Nature, Ottawa, Canada.
- 2007: Participant in NASA's Spaceward Bound (1 week), in which educators learn from scientists about astrobiology field research (<http://quest.nasa.gov/projects/spacewardbound/mojave2007/>).

Professional Organizations

- Society for the Study of Evolution (SSE)
- American Society of Naturalists (ASN)
- Canadian Society for Ecology and Evolution (CSEE)
- European Society for Evolutionary Biology (ESEB)
- American Association for the Advancement of Science (AAAS)
- Union of Concerned Scientists (UCS)

References

- Philipp Messer, research collaborator (Cornell University), messer@cornell.edu
- Andrew Hendry, PhD supervisor (McGill University), andrew.hendry@mcgill.ca
- Rupert Mazzucco, research collaborator (IIASA, Austria; direct supervisor), mazzucco@iiasa.ac.at
- Ulf Dieckmann, research collaborator (IIASA, Austria; program leader), dieckmann@iiasa.ac.at
- Elena Conti, research collaborator (University of Zurich), elena.conti@systbot.uzh.ch