Curriculum Vitae

Alexander Nater

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Current address	Münzgasse 14, D-78462 Konstanz, Germany
Date of birth	November 10, 1981

Research Interests

My research interests revolve around the interaction of environmental processes and socio-behavioral factors and how they shape patterns of genetic diversity within and among populations.

- Investigation of processes leading to genetic structuring and differentiation of natural populations and species.
- Use of genomic data to reveal targets of selection and identify factors promoting local adaptation and reproductive isolation.
- Disentangling the effects of demographic history, selection, and stochasticity in shaping genome-wide patterns of diversity.
- Application of molecular approaches to identify and conserve genetic diversity in endangered species.

Employment

Jan. 2017 –	Postdoctoral researcher in the group of Axel Meyer in the Laboratory for Zoology and Evolutionary Biology, University of Konstanz, Germany
Sep. 2015 – Dec. 2016	Postdoctoral research fellow in the group of Lukas Keller at the Department of Evolutionary Biology and Environmental Studies, University of Zurich, Switzerland
Mar. 2013 – July 2015	Postdoctoral researcher in the group of Hans Ellegren at the Evolutionary Biology Centre, Uppsala University, Sweden
Aug. 2012 – Jan. 2013	Postdoctoral researcher in the group of Tony Wilson at the Department of Evolutionary Biology and Environmental Studies, University of Zurich, Switzerland
Aug. 2007 – June 2011	Research and teaching assistant in the group of Michael Krützen at the Anthropological Institute and Museum, University of Zurich, Switzerland

Education

Aug. 2007 – June 2012	Ph.D. in Evolutionary Biology, University of Zurich, Switzerland Dissertation: Processes Underlying Genetic Differentiation and Speciation in Orangutans (*Pongo* spp.), submitted March 2012

Feb. 2006 – June 2007	M.Sc. in Evolutionary Anthropology, University of Zurich, Switzerland (summa cum laude) Thesis title: New microsatellite markers in orangutans (*Pongo* spp.) and bottlenose dolphins (*Tursiops* spp.)
Oct. 2001 – Nov. 2005	B.Sc. in Biology, University of Zurich, Switzerland, 2005 (magna cum laude)

Teaching Experience

Nov. 2016 – Dec. 2016	Teaching associate for student course «Principles of Evolution», University of Zurich, Switzerland
Mar. 2013 – Aug. 2015	Co-supervisor of Ph.D. students, Evolutionary Biology Centre, Uppsala University, Sweden
Nov. 2012 – Dec. 2012	Teaching assistant for student course «Principles of Evolution», University of Zurich, Switzerland
Nov. 2007 – Dec. 2011	Teaching associate and lecturer for student course «Evolutionary Genetics of Primates», University of Zurich, Switzerland
Aug. 2007 – May 2012	Co-supervisor of M.Sc. students, Anthropological Institute and Museum, University of Zurich
Aug. 2007 – May 2010	Involvement in establishing a genetics laboratory at the Bogor Agricultural University to conduct genetic analysis of orangutan samples in Indonesia
Nov. 2006 – May 2012	Laboratory instructor, Anthropological Institute and Museum, University of Zurich
Oct. 2004 – Jan. 2006	Tutorial assistant for lecture series «Ecology and Diversity of Microorganism», University of Zurich, Switzerland

Research Experience

Mar. 2016 – June 2016	Molecular basis of egg size variation in Japanese quails using Pool-seq whole-genome data from selection lines (collaboration with Prof. B. Tschirren and Dr. M. Greminger from the University of Zurich)
Jan. 2015 –	Chromosome-scale simulations of genomic landscapes of diversity and differentiation (collaboration with Prof. H. Ellegren and Dr. A. Rettelbach from Uppsala University)
Aug. 2013 –	Population genomics of orangutans (collaboration with Dr. M. Krützen and Dr. M. Greminger from the University of Zurich, Prof. T. Marques-Bonet and Prof. J. Bertranpetit from the Pompeu Fabra University Barcelona, and Dr. Aylwyn Scally from the University of Cambridge)

Mar. 2013 – Aug. 2015	Population and speciation genomics in *Ficedula* flycatchers (whole-genome sequences of 300+ individuals)
Aug. 2012 – Jan. 2013	Population genetic and demographic analysis of European seahorses (*Hippocampus guttulatus*)
Feb. 2011 – June 2013	Demographic modeling of orangutan populations using Approximate Bayesian Computation
Aug. 2010 – Apr. 2011	Development of microsatellite markers in pine hoverflies using high-throughput sequencing (collaboration with Dr. L. Bussière from the University of Stirling)
Nov. 2008 – Feb. 2011	Phylogeographic and population genetic analyses of orangutan populations
Aug. 2008 – Sep. 2009	Field work (twice four months) associated with the non-invasive collection of genetic samples from orangutans in Sumatra, Indonesia
June 2006 – Oct. 2007	Cloning and characterization of microsatellite markers in various non-model organisms

Awards

- Stephen J. O'Brien award from the American Genetic Association for best student-authored article «Marked population structure and recent migration in the critically endangered Sumatran orangutan (*Pongo abelii*)», April 2014.
- Award for outstanding scientific achievements from the Faculty of Science of the University of Zurich for the Ph.D. thesis «Processes Underlying Genetic Differentiation and Speciation in Orangutans (*Pongo* spp.)», October 2012.

Other Academic Activities

- Reviewer for Genome Biology and Evolution, Molecular Biology and Evolution, Molecular Ecology, Heredity, BMC Evolutionary Biology, Molecular Phylogenetics and Evolution, Conservation Genetics, and others.

  Publons pofile: https://publons.com/author/1004727/alexander-nater#profile
- Organizer of a Ph.D. retreat for the Ph.D. program in Evolutionary Biology, University of Zurich, Switzerland, 2010
- Organizer of Journal Club, Anthropological Institute and Museum, University of Zurich, Switzerland, 2010–2011

Manuscripts in Preparation

- **Nater, A.**; Greminger, M. P.; Nurcahyo, A.; Nowak, M. G.; (…); Scally, A.; Marques-Bonet, T.; Meijaard, E.; Krützen, M. Morphometric, behavioural, and genomic evidence for a new orangutan species. In revision for Nature.
- Greminger, M. P.; **Nater, A.**; Roos, C.; Goossens, B.; Gut, M.; Gut, I. G.; van Schaik, C. P.; Marques-Bonet, T.; Krützen, M. Power and necessity of incorporating male-specific genomic data in analyses of species with discordant sex-specific evolutionary histories: a case study in orangutans (genus: *Pongo*). In revision for Molecular Ecology.
- Rianti, P.; Perwitasari-Farajallah, D.; Sajuthi, D.; Pamungkas, J.; **Nater, A.**; Singleton, I.; Wich, S. A.; van Schaik, C. P.; Krützen, M. Population structure and conservation units of the critically endangered Sumatran orangutans (*Pongo abelii*). In revision for the International Journal of Primatology.
- Kawakami, T.; Mugal, C. F.; Suh, A.; **Nater, A.**; Burri, R.; Smeds, L.; Ellegren, H. Whole-genome patterns of linkage disequilibrium in flycatcher genomes clarify the causes and consequences of fine-scale recombination rate variation in birds. In preparation.

Peer-Reviewed Publications

- Nam, K.; Munch, K.; Mailund, T; **Nater, A.**; Greminger, M. P.; Krützen, M.; Marques-Bonet, T.; Schierup, M. H. (in press). Evidence that the rate of strong selective sweeps increases with population size in the great apes. Proceedings of the National Academy of Sciences of the United States of America.
- Kuhlwilm, M.; de Manuel, M.; **Nater, A.**; Greminger, M. P.; Krützen, M.; Marques-Bonet, T. (2016). Evolution and demography of the great apes. Invited review for Current Opinion in Genetics and Development, 41: 124–129.
- Dutoit, L.; Burri, R.; **Nater, A.**; Mugal, C. F.; Ellegren, H. (2016). Genomic distribution and estimation of nucleotide diversity in natural populations: perspectives from the collared flycatcher (*Ficedula albicollis*) genome. Molecular Ecology Resources: 10.1111/1755-0998.12602
- Uebbing, S.; Künstner, A.; Mäkinen, H.; Backstrom, N.; Bolivar, P.; Burri, R.; Dutoit, L.; Mugal, C.; **Nater, A.**; Aken, B.; Flicek, P.; Martin, F.; Searle, S.; Ellegren, H. (2016). Divergence in gene expression within and between two closely related flycatcher species. Molecular Ecology, 25: 2015–2028.
- Bolivar, P.; Mugal, C.; **Nater, A.**; Ellegren, H. (2016). Recombination rate variation modulates gene sequence evolution mainly via GC-biased gene conversion, not Hill-Robertson interference, in an avian system. Molecular Biology and Evolution, 33: 216–227.
- Rianti, P.; Perwitasari-Farajallah, D.; Sajuthi, D.; Pamungkas, J.; **Nater, A.**; Krützen, M. (2015). Identification of diagnostic mitochondrial DNA single nucleotide polymorphisms specific to Sumatran orangutan (*Pongo abelii*) populations. HAYATI Journal of Biosciences: 10.1016/j.hjb.2015.09.002.
- Burri, R.; **Nater, A.**; Kawakami, T.; Mugal, C.; Olason, P.; Smeds, L.; Suh, A.; Dutoit, L.; Bures, S.; Garamszegi, L.; Hogner, S.; Moreno, J.; Qvarnström, A.; Ruzic, M.; Saether, S. A.; Sætre, G. P.; Török, J.; Ellegren, H. (2015). Linked selection and

recombination rate variation drive the evolution of the genomic landscape of differentiation across the speciation continuum of *Ficedula* flycatchers. Genome Research, 25: 1656–1665.

- **Nater, A.**; Burri, R.; Kawakami, T.; Smeds, L.; Ellegren, H. (2015). Resolving evolutionary relationships in closely related species with whole-genome sequencing data. Systematic Biology, 64: 1000–1017.
- Smeds, L.; Warmuth, V.; Bolivar, P.; Uebbing, S.; Burri, R.; Suh, A.; **Nater, A.**; Bures, S.; Garamszegi, L.; Hogner, S.; Moreno, J.; Qvarnström, A.; Ruzic, M.; Saether, S. A.; Sætre, G. P.; Török, J.; Ellegren, H. (2015). Evolutionary analysis of the female-specific avian W chromosome. Nature Communications 6: 10.1038/ncomms8330.
- **Nater, A.**; Greminger, M. P.; Arora, N.; van Schaik, C. P.; Goossens, B.; Singleton, I.; Verschoor, E. J.; Warren, K. S.; Krützen, M. (2015). Reconstructing the demographic history of orang-utans using Approximate Bayesian Computation. Molecular Ecology, 24: 310–327.
- Greminger, M. P.; Stölting, K. N.; **Nater, A.**; Goossens, B.; Arora, N.; Bruggmann, R; Patrignani, A; Nussberger, B.; Sharma, R; Kraus, R. H. S.; Ambu, L.; Singleton, I.; Chikhi, L; van Schaik, C. P.; Krützen, M. (2014). Generation of SNP datasets for orangutan population genomics using improved reduced-representation sequencing and direct comparisons of SNP calling algorithms. BMC Genomics, 15:16.
- **Nater, A.**; Arora, N.; Greminger, M. P., van Schaik, C. P., Singleton, I.; Wich, S. A.; Fredriksson, G.; Perwitasari-Farajallah, D.; Pamungkas, J.; Krützen, M. (2013). Marked population structure and recent migration in the critically endangered Sumatran orangutan (*Pongo abelii*). Journal of Heredity, 104: 2–13.
- Sharma, R.; Arora, N.; Goossens, B.; **Nater, A.**; Morf, N.; Salmona, J.; Bruford, M. W.; van Schaik, C. P.; Krützen, M.; Chikhi, L. (2012). Effective population size dynamics and the demographic collapse of Bornean orang-Utans. PLOS ONE 7: e49429.
- Rotheray, E. L.; Lepais, O.; **Nater, A.**; Krützen, M.; Greminger, M.; Goulson, D.; Bussière, L. F. (2012). Genetic variation and population decline of an endangered hoverfly *Blera fallax* (Diptera: Syrphidae). Conservation Genetics, 13: 1283–1291.
- Arora, N.; van Noordwijk, M.; Ackermann, C.; Willems, E. P.; **Nater, A.**; Greminger, M. P.; Nietlisbach, P.; Dunkel, L.; Utami Atmoko, S.; Pamungkas, J.; Perwitasari-Farajallah, D.; van Schaik, C. P.; Krützen, M. (2012). Parentage-based pedigree reconstruction reveals female matrilineal clusters and male-biased dispersal in nongregarious Asian great apes, the Bornean orang-utans (*Pongo pygmaeus*). Molecular Ecology, 21: 3352–3362.
- Wich, S. A.; Krützen, M.; Lameira, A. R.; **Nater, A.**; Arora, N.; Bastian, M. L.; Meulman, E.; Morrogh-Bernard, H. C.; Utami Atmoko, S. S.; Pamungkas, J.; Perwitasari Farajalla, D.; Hardus, M. E.; van Noordwijk, M.; van Schaik, C. P. (2012). Call cultures in orang-utans? PLOS ONE 7: e36180.
- Nietlisbach, P.; Arora, N.; **Nater, A.**; Goossens, B.; van Schaik, C. P.; Krützen, M. (2012). Heavily male-biased long distance dispersal of orang-utans (genus: *Pongo*), as revealed by Y chromosomal and mitochondrial genetic markers. Molecular Ecology, 21: 3173–3186.
- Rotheray, E. L.; Greminger, M. P.; **Nater, A.**; Krützen, M.; Goulson, D.; and Bussière, L. F. (2012) Polymorphic microsatellite loci for the endangered pine

hoverfly *Blera fallax* (Diptera: Syrphidae). Conservation Genetics Resources, 4: 117–120.

- **Nater, A.**; Nietlisbach, P.; Arora, N.; van Schaik, C. P.; van Noordwijk, M. A.; Willems, E. P.; Singleton, I.; Wich, S. A.; Goossens, B.; Warren, K. S.; Verschoor, E. J.; Perwitasari-Farajallah, D.; Pamungkas, J.; Krützen, M. (2011). Sex-biased dispersal and volcanic activities shaped phylogeographic patterns of extant orangutans (genus: *Pongo*). Molecular Biology and Evolution, 28: 2275–2288.
- Arora, N.; **Nater, A.**; van Schaik, C. P.; Willems, E. P.; van Noordwijk, M. A.; Morf, N.; Krützen, M. et al (2010). Effects of Pleistocene glaciations and rivers on the population structure of Bornean orangutans (*Pongo pygmaeus*). Proceedings of the National Academy of Sciences of the United States of America, 107: 21376–21381.
- Nietlisbach, P.; **Nater, A.**; Greminger, M. P.; Arora, N.; and Krützen, M. (2010) A multiplex-system to target 16 male-specific and 15 autosomal genetic markers for orang-utans (genus: *Pongo*). Conservation Genetics Resources, 2: 153–158.
- Greminger, M. P.; Schäfer, M. A.; **Nater, A.**; Blanckenhorn, W. U.; Krützen, M. (2009). Development of polymorphic microsatellite markers for the dung fly (*Sepsis cynipsea*). Molecular Ecology Resources, 9: 1554–1556.
- **Nater, A.**; Kopps, A. M.; Krützen, M. (2009). New polymorphic tetranucleotide microsatellites improve scoring accuracy in the bottlenose dolphin *Tursiops aduncus*. Molecular Ecology Resources, 9: 531–534.
- **Nater, A.**; Krützen, M.; Lindholm, A. K. (2008). Development of polymorphic microsatellite markers for the livebearing fish *Poecilia parae*. Molecular Ecology Resources, 8: 857–860.

Conference Presentations

- Genomic Footprints of Glacial Cycles in the Evolutionary History of Orangutans (*Pongo* spp.). Talk at the 26th Congress of the International Primatological Society (IPS), August 21-27, 2016 in Chicago, United States.
- Using Approximate Bayesian Computation to investigate genome-wide patterns of diversity and differentiation in *Ficedula* flycatchers. Poster presentation at the Annual Meeting of the Society for Molecular Biology and Evolution (SMBE), June 8-12, 2014 in San Juan, Puerto Rico.
- Approximate Bayesian Computation sheds light on the complex demographic history of orangutans. Poster presentation at the Annual Meeting of the Society for Molecular Biology and Evolution (SMBE), June 23-26, 2012 in Dublin, Ireland.
- Sex-biased dispersal and volcanic activities shaped phylogeographic patterns of extant orangutans (genus: *Pongo*). Talk at the Annual Meeting of the Society for Molecular Biology and Evolution (SMBE), July 26-30, 2011 in Kyoto, Japan.
- Sex-biased dispersal and volcanic activities shaped phylogeographic patterns of extant orangutans (genus: *Pongo*). Talk at the Biology11 and PACE11 conference, February 2-4, 2011 in Zurich, Switzerland.
- Disentangling the complex population history of orangutans. Talk at the 23th Congress of the International Primatological Society (IPS), September 12-18, 2010 in Kyoto, Japan.

- New polymorphic tetranucleotide microsatellite markers in bottlenose dolphins (*Tursiops aduncus*). Poster presentation at the 17th Biennial Conference on the Biology of Marine Mammals, November 29–December 3, 2007 in Cape Town, South Africa.
- Influence of ascertainment bias on the estimates of genetic diversity with human-derived microsatellites in orangutans. Poster presentation at the 2nd Congress of the European Federation for Primatology (EFP), September 3–7, 2007 in Prague, Czech Republic.

Third-Party Funding

- Postdoctoral Fellowship by the Forschungskredit of the University of Zurich, 90,500 CHF (2015)
- Travel grant by the American Genetic Association, 1500 USD (2014)
- Research grant by the A.H. Schultz Foundation, 6300 CHF (2011)
- Travel grant by the Faculty of Science, University of Zurich, 1600 CHF (2011)
- Travel grant by the Society for Molecular Biology and Evolution, 15000 JPY (2011)
- Travel grant by the A.H. Schultz Foundation, 600 CHF (2010)
- Travel grant by the PhD Program in Evolutionary Biology, University of Zurich, 500 CHF (2010)
- Travel grant by the A.H. Schultz Foundation, 1700 CH (2007)
- Research grant by the A.H. Schultz Foundation, 1200 CH (2006)

Skills and Qualifications

- Good programming skills in Perl, Python, R, and C++
- Proficient in high-performance computing management systems (SLURM, SGE, OpenStack, ElastiCluster, GC3Pie)
- Software for genomic data analysis (BWA, Picard, SAMtools, ANGSD, GATK, etc.)
- Population genetic and phylogenetic software (Arlequin, Structure, TESS, PAUP, RAxML, MrBayes, BEAST, etc.)
- Software for demographic analysis and data simulation (ABCtoolbox, PSMC, MSMC, MSVAR, LAMARC, Migrate, IM, SLiM, fwdpp, etc.)
- Good scientific writing skills in English and German
- Fluent in German and English, basic knowledge in French and Bahasa Indonesia

References

- Prof. Lukas Keller, Postdoctoral supervisor, Department of Evolutionary Biology and Environmental Studies, University of Zurich, lukas.keller@ieu.uzh.ch, +41 44 635 47 50
- Prof. Hans Ellegren, Postdoctoral supervisor, Department of Evolutionary Biology, Uppsala University, hans.ellegren@ebc.uu.se, +46 18 471 64 60
- Prof. Tony Wilson, Postdoctoral supervisor, Department of Biology, Brooklyn College, City University of New York, twilson@brooklyn.cuny.edu, +1 718 951 5000 ext. 6953
- PD Dr. Michael Krützen, Ph.D. supervisor, Anthropological Institute and Museum, University of Zurich, michael.kruetzen@aim.uzh.ch, +41 44 635 54 12