Newsletter September 2014

Welcome to the 5th edition of the PopGen ALUMNI newsletter!

Recent events

July 2014: Evolution explained to 10-12 year-olds

How to explain to kids what Evolution is? Three of our students managed to bring this complex topic into the spotlight during a "Kinderuni" (Kid's University) workshop in front and in midst of 25 curious and active school kids. The children asked surprisingly clever questions, and agreed that fruit flies are ideal to observe evolution in the lab.

July, August 2014: Internships for high school students

During Summer 2014, four high school students were hosted at PopGen Vienna. Bernadette, Thomas, Julia and Clemens were selected from a number of interested high school students to spend one month during summer at PopGen Vienna, collaborating with our PhD student Tom Hill (group Betancourt) and Barbara Horvath (group Kalinka) to gain insight into hands-on science.

September 2014: 5th DK Welcome Event

For the yearly welcome event we showed our new students around Vienna's scenic vineyards of the Nussberg with great views across the city.

The weather was perfect for our hike. We even spotted bats who clearly enjoyed the lovely autumn evening as well. A bit exhausted we arrived at a local "Heurigen" restaurant close to Kahlenbergerdorf with a beautiful view across the Danube. The first "Sturm" of the year sparked interesting and fun conversations

among senior and newcoming students until we made a moonlit climb back down to Vienna.

September 2014: Introductory course
The yearly Population Genetics Introductory Course for PhD students started on September 1. Six new PopGen Vienna students attend the intense course and also this year several international students from as far away as Brasil and Mexico were accepted to take part in the course. A new and feature this year are informal “fireplace” talks with the teaching faculty. Feedback is very positive so far: the students appreciate the informal yet motivating atmosphere, learning about the personal side of the faculty while talking about career choices and life as scientists.

Recent visitors

Dr. **Bertanne Visser** is a postdoctoral fellow at the Institute for Insect Biology (Université François-Rabelais, Tours) in France. Her work has largely focused on the causes and consequences of evolutionary trait loss, specifically the loss of lipid synthesis in parasitic wasps. Bertanne visited us at the end of August to collaborate with the Schlötterer group and develop new research lines into the processes and mechanisms driving trait loss and reversion in parasitic wasps.

Dr. **Saber Qanbari** is a research associate at the Division of Animal Breeding and Genetics (University of Goettingen) and visits the the group of Prof. Schlötterer at the Vienna Graduate School of Population Genetics during September 2014. His research mainly focuses on population genetics and genomics of domestic species. While in Vienna, he works on developing computational approaches to detect and localize signatures of past selection in the genome.

Alumni lab portraits

We feature a brief report about one of PopGen's graduate and faculty alumni in every Newsletter. Florian Clemente told us about his postdoc experiences in the last edition.

This time, graduate **Martin Kapun** gives us some insight into his postdoc research in **Lausanne** (Group of PopGen Vienna alumnus Thomas Flatt):

"I have joined the group of Thomas Flatt (a former group leader at the Institute of Population Genetics) in Lausanne in 2013. In my postdoc, my main research interests are focused on understanding the genomic patterns of adaptation using *Drosophila melanogaster* as a system. I am particularly interested in the evolutionary mechanisms that shape spatial and temporal genetic and phenotypic variation among populations. My current projects represent an extension of my Ph.D. thesis work supervised by Christian Schlötterer and Thomas Flatt: in my thesis work, I had used whole-genome sequencing to study genomic patterns of adaptation in (1) populations subject to experimental evolution under fluctuating temperatures and (2) natural populations collected along the latitudinal cline spanning the North American east coast. A striking result of both studies was the prominent effect of chromosomal inversions in shaping genetic variation, a fascinating pattern which I got very strongly interested in. Consequently, my current postdoc projects focus on three key questions about the evolutionary impact of chromosomal inversions: (1) How do chromosomal inversions shape genetic variation? (2) What are the mechanisms involved in the maintenance of chromosomal inversion in natural populations? (3) What is the link between chromosomal inversions and phenotypic variation?

To address these questions, I am using homokaryons lines (isogenic for different karyotypes) isolated from populations along the North American east coast. I am investigating genomic variation associated with inversions using whole genome sequencing as well as phenotypic differences using phenotyping assays for multiple life history traits. In parallel, I am studying the geographic distribution and genetic variation of inversions in a dataset that consists of more than 30 samples (from more than 10 locations) collected in North America and Europe generated by an international collaborative consortium led by Alan Bergland and colleagues. Besides my main interest in inversions, I am also involved in the analysis of different "evolve and re-sequencing" (E&R) projects in collaboration with Tad Kawecki and Bas Zwaan. Moreover, together with Thomas and Josefa Gonzalez, I am part of the organizational committee of the European Drosophila Population Genomics Consortium (DrosEU consortium) which aims to generate sequence data for *D. melanogaster* populations densely sampled across Europe.

Despite my continuing problems communicating with the locals due to my deficiencies in speaking proper French, I very much enjoy my time in Lausanne -

not only because of the fantastic, lovely team in Thomas' group, the great infrastructure and the stimulating intellectual atmosphere, but also because of my growing family and the beauty of the Lake Geneva region. "

Mountaineers Martin and Theo in the Swiss Alps

Out of sight, out of mind?

Experiences of our students abroad

Many of our students choose to spend 3 months in foreign labs during their study time. In each of the Newsletters one of them tells us about their experiences.

Ludwig Geroldinger (advisors Reinhard Bürger, Joachim Hermisson and Claus Vogl) was hosted by Fred Guillaume as guest student at the **ETH Zürich** from April to June 2013:

"In spring 2013, I spent three months at the ETH-Zürich to work with Frederic Guillaume. I first met Frederic in the Tuesday Seminar series and had also stumbled across his papers previously in our Journal Club.
Frederic programmed Nemo, a stochastic, individual-based, genetically explicit simulation platform, designed to study the evolution of life history/phenotypic traits and population genetics in a flexible (meta-)population framework.
During my stay in Zürich, we adapted Nemo to the models in my PhD-thesis and used it to investigate patterns of neutral variation, linked to selected loci in finite populations. It was very enjoyable and productive to work in a group focussing on theoretical population genetics.
Apart from population genetics and mathematics, Zürich turned out to be a great place for swimming and hiking.

Within one hour the Alps could be reached : the scenery is impressive! I explored the mountains with my friend Simon Aeschbacher (left in the picture, you know him from our retreats, now postdoc in the Coop lab at UCD) and other friends who visited me."

Upcoming events

This year's **retreat** will be held from October 3-5 at Altaussee, similar to last year. We'll be 30 participants and are looking forward to a guest lecture by Wolfgang Miller ("*Symbiotic Speciation: Concepts, Causes and Consequences*"). This year we'll have a bit more time for the Saturday hike – and a few courageous colleagues will climb a challenging Via Ferrata.

After the big success of the NGS course in May 2011 we're organising a **practical course on next generation sequencing for population genetics and experimental evolution** in October. From more than 70 international applicants, 25 successful candidates were selected. Our students will assist them as tutors during the one-week intensive course.

We're preparing for the important **FWF hearing** on November 4 that will decide about a second funding period of 4 years, starting from January 2015. We'll use the opportunity to bring our alumni back for a **Mini Symposium** on November 5

– we're happy that Claudia Bank (Lausanne), Florian Clemente (Cambridge), Martin Kapun (Lausanne) and Nicola de Maio (Oxford) will visit us and present their current project.

Last but not least we're proud to host **SBME 2015** in Vienna this coming Summer!

Upcoming seminars

We're looking forward to exciting talks during this winter term by **Kai Zeng, Michele Morgante, Santiago Elena, Sinead Collins, Josefa Gonzalez, Barbara Mable, Peter Andolfatto, Patrik Nosil**, **Andreas Wagner, Paul Jenkins, John Huelsenbeck and Hinrich Schulenburg.**

Publications of our students

New publications since the last Alumni News edition:

Christian Huber, M. Nordborg, J. Hermisson, I. Hellmann (2014): Keeping it Local: Evidence for Positive Selection in Swedish *Arabidopsis thaliana*. *Molecular Biology and Evolution* (accepted)

Ludwig Geroldinger and R. Bürger (2014): Existence and shape of clines in quantitative traits: The role of migration patterns and selection scenarios. Under review in *Theoretical Population Biology*

C. Schlötterer, **Raymond Tobler**, R. Kofler, V. Nolte: MolBiolEvol 2014: Sequencing pools of individuals - mining genome-wide polymorphism data without big funding. *Nature Reviews Genetics* doi:10.1038/nrg3803

Have a fine autumn!