Oak Spring eFLOWER Summer School
Final report, version 3

Attachments:
- Event booklet with detailed program and list of participants (eFLOWER Summer School_Oak Spring program booklet.pdf)
- Online photo album: https://photos.app.goo.gl/Z3aY2dMszSYPGuBA9

Background on the Oak Spring Garden Foundation and the eFLOWER project

The Oak Spring eFLOWER Summer School was held at the Oak Spring Garden Foundation in Upperville, Virginia (USA) from 18 to 27 September 2018. The Oak Spring Garden Foundation (OGSF) is a new philanthropic foundation based at the former primary estate of the late Mr. and Mrs. Paul Mellon, who were major philanthropists in the U.S. of the arts, humanities and sciences in the second half of the twentieth century. OSGF is located in northern Virginia, in the piedmont of the Blue Ridge Mountains (ca. one-hour drive from Washington, D.C.). Led by Sir Peter Crane, the Foundation’s inaugural President, OSGF is an ideal venue for small conferences, workshops, and retreats and is becoming a new centre of stimulation of all things botanical, from fundamental research in plant evolution and conservation, to horticultural and plant conservation practice, to the history and art of plants gardens and landscapes. For more information, see https://www.osgf.org/.

The eFLOWER project is a long-term international initiative to answer key questions in the evolution of flowers in angiosperms (flowering plants) from their origin ca. 140 million years ago to the present day. Started in 2011, the project is currently led by Dr Hervé Sauquet (Royal Botanic Gardens and Domain Trust, Australia), Prof. Jürg Schönenerger and Dr Maria von Balthazar (University of Vienna, Austria), and Prof. Susana Magallón (Universidad Nacional Autónoma de México, Mexico). At the heart of the project is a collaborative database named PROTEUS designed by Hervé Sauquet and hosted on a server at the University of Vienna. PROTEUS allows multiple users to record plant morphological traits while tracking the source (reference) of every piece of information. The first eFLOWER Summer School organized in Vienna in July 2013 had allowed a diverse group of international students to help us build a very large dataset of floral traits in PROTEUS, ultimately leading to the publication of our keystone paper in Nature Communications in 2017. This paper, which presented a new model for the ancestral flower of all angiosperms, attracted considerable media attention worldwide. For more information, see http://www.eflower.org/.
Goals and program of the Summer School

The goal of the Oak Spring Summer School was to deliver high-quality training in the modern comparative methods used to study plant macroevolution, while at the same time offering the students the opportunity to contribute to future targets of the eFLOWER project. The Summer School was thus structured around the alternation of ‘Data Days’ and ‘Analytical Days’ (four each). Each Data Day, we focused on recording floral and fossil data for selected groups of flowering plants in PROTEUS. Each Analytical Day addressed a specific methodological topic, with a theoretical morning class introducing the fundamentals, and an afternoon hands-on practical to implement methods presented in the morning, using real-life plant datasets provided by us and/or built together over the data days. The topics addressed were ancestral state reconstruction of morphological traits (using maximum likelihood and Bayesian methods), divergence time estimation using molecular dating methods (relaxed clock methods, fossil calibration), and diversification rates and state-dependent diversification.

In addition, each day was interrupted by a seminar talk, usually before lunch, and each student also gave a flash talk on their own research project in sessions scheduled before dinner. Seminar talks were given by the organizers (two each) and three invited speakers, Prof. Else Marie Friis, Dr. Stacey Smith, and Dr. Laura Lagomarsino (the last two, current and past members of SSB's Executive Committee, and Council). All details are provided in attached booklet. A diverse social program, including mixers and dinners, and free evenings allowed the students to get to know each other and establish new professional connections. Lastly, a day trip to the National Museum of Natural History of the Smithsonian Institution in Washington, D.C. in the middle of the School allowed the students to visit one of the largest natural history collections in the World. Dr Vicki Funk, a well-known leader in plant systematics and former President of SSB, gave us a private tour of the Herbarium and made a very strong impression on the students through discussions on the importance of vouchers and better collecting practices.

Funding

The Oak Spring eFLOWER Summer School was entirely funded by the Oak Spring Garden Foundation and a US$ 4000 grant from the Society of Systematic Biologists (SSB). This allowed us to sustain a ‘free’ model, whereby all flights (and transfers from the airport), food, and accommodation were covered for all participants, organizers, and invited speakers, and no registration fee was requested. This model is very rare among the rapidly growing ecosystem of graduate courses and summer schools offered worldwide, and without doubt allowed some very relevant students to benefit from the training, who would otherwise never have afforded to participate.

Participants

The 15 students who participated in the Summer School were selected on the basis of a competitive call for applicants, which was circulated through various websites, social media, scientific societies, and among colleagues on 11 April 2018, with an application deadline set to 1st June 2018. In total, 42 applications were received from 19 countries, most of them relevant and of high quality. This allowed us to operate a strong selection, which resulted in an exceptional and diverse group of 15 talented students, who remained...
actively engaged with us throughout the event. The nine female and six male students came from seven countries (Australia, Brazil, Canada, France, Mexico, U.K., U.S.A.) and represented nine nationalities. Twelve were PhD students (from starting to just graduated), two were master’s students, and one was an honour’s student (undergrad). A strong group cohesion and general positive atmosphere was noticeable throughout the event.

Figure 5. Group picture on Day 4 of the School with the three main instructors.  
Figure 6. Group picture on Day 9 of the School.

A short video produced by one of the students and presenting the Summer School is currently being finalized and will be posted on various websites and social media shortly. The aims are to share this experience with other colleagues, to help both the OGSF and the eFLOWER project to be better known among the scientific community, and to attract other excellent students to future eFLOWER Summer Schools.

Evaluation summary

This was an exceptional event in many ways and all people involved (organizers, invited speakers, students) were extremely satisfied with the Summer School. An anonymous post-course survey is currently being filled by the participants. Importantly, the Oak Spring location and facilities provided a remarkable environment for this type of event, where both the isolation and beautiful and peaceful setting allowed everyone to concentrate entirely on the scientific activities scheduled in the program, while sharing all meals together for nine consecutive days played a key role in networking and generating new ideas. This was the longest running event with the largest group at Oak Spring, and the first training course aimed at graduate students. Despite the logistic challenges it created, OGSF appeared very satisfied with the result and has said that trialling this type of events with us will play an important role in future hosted courses, for which a competitive call will start next year.

From a scientific and training perspective, the Summer School worked very well and we were all satisfied with our new model alternating data entry and core training in macroevolutionary methods. Both the length of the event (nine days) and the total number of participants (15) seemed perfectly adequate to achieve our goals and everyone was very satisfied with the invited speakers, who provided additional interactions, professional contacts, and expertise complementary to those of the organizers. The main improvements we identified lie in some logistics details and our hands-on practicals to train students in advanced comparative methods.

Future eFLOWER Summer Schools

This event also provided a rare opportunity for three of the four coordinators of the eFLOWER project to meet and discuss current and future directions of the project. Several papers are currently in preparation, including one for which an outline was drafted during the School. A key decision that emerged from this event is our plan to seek external funding for and organize new eFLOWER Summer Schools every one or two years in rotating locations from this point onwards. The next eFLOWER Summer School was thus tentatively planned to take place at the Royal Botanic Gardens and Domain Trust in Sydney in January 2020.

Hervé Sauquet, Susana Magallón, Jürg Schönenberger, and Peter Crane, 19 October 2018