

44th ALTENBERG WORKSHOP IN THEORETICAL BIOLOGY

Measuring Development and Evolution of Form

organized by
Philipp Gunz, Philipp Mitteröcker, Katrin Schäfer

September 16 to 19, 2025

Konrad Lorenz Institute for Evolution and Cognition Research
Klosterneuburg, Austria

Welcome

to the 44th Altenberg Workshop in Theoretical Biology. The Altenberg Workshops are interdisciplinary meetings organized by the KLI in Klosterneuburg, Austria, initially based in the village of Altenberg. The workshop themes are selected for their potential impact on the advancement of biological theory. Leading experts in their fields are asked to invite a group of internationally recognized scientists for three days of open discussion in a relaxed atmosphere. By this procedure the KLI intends to generate new conceptual advances and research initiatives in the biosciences. We are delighted that you are able to participate in this workshop, and we wish you a productive and enjoyable stay.

Philipp Mitteröcker
President

Aims

Our vision for the workshop is to foster an engaging, collaborative dialogue between experts in morphometric theory and researchers facing complex challenges and requiring innovative approaches. By bringing together method and software developers alongside users from various disciplines and experience levels, we aim to create a practical and solution-oriented environment.

The workshop will begin with brief presentations on the first day, during which participants can share new ideas, highlight methodological challenges, or pose research questions that could inspire further development in morphometrics. The second part of the workshop will then be dedicated to smaller working groups, each focusing on a specific topic. These groups will collaborate on discussions, coding, analyses, and writing. Topics will be defined collaboratively before and during the first day of the workshop.

In addition to reconnecting with old friends and making new connections within the morphometrics community, an ideal outcome of the workshop would be the development of collective papers and/or an edited volume. For this purpose, we have the opportunity to utilize the KLI's journal (*Biological Theory*, Springer) and book series (*Vienna Series in Theoretical Biology*, MIT Press).

Format

We commence on Tuesday evening with stimulating talks that introduce some of the general biological framework within which our workshop is embedded. These presentations are intended to provide context and set the stage for the week's discussions.

On Wednesday, the program begins with a series of presentations, each allocated 30 minutes—approximately 15 minutes for the talk itself, followed by 15 minutes for questions and discussion. In the afternoon, participants with and without posters may deliver elevator pitches highlighting main question and challenges driving their work, which will lead into the poster session for in-depth dialogue and interactive Q&A.

Thursday is devoted entirely to hands-on thematic working groups, where participants engage intensively in collaborative projects. The day concludes with the “Software Clinic”, an interactive session encouraging participants to actively work with the tools and software most relevant to their research.

On Friday, we conclude the workshop with brief reports summarizing the progress and key achievements of the parallel working groups. This will be followed by a general discussion and planning for potential publications, consolidating the insights and outcomes of the week.

Throughout the workshop, time allocated for coffee breaks, lunches, and dinners is purposefully designed to foster discussion, reflection, and networking, allowing participants to exchange ideas and build collaborations in a more informal setting.

Measuring Development and Evolution of Form

**Tuesday
16 September**

Evening

Welcome Reception

17:00 – 21:00

Registration and Buffet

18:00

Günter Wagner: Homology & Meaningful Measurement

Gerd Müller: A Few Remarks on Novelty

**Wednesday
17 September**

Morning

From Landmarks to Multimodal Biomarkers

09:00 – 09:15

Organizers

Welcome & Introductory Statement

09:15 – 09:45

F. James Rohlf

Perspectives on the Current State of Morphometrics

09:45 – 10:15

Benedikt
Hallgrímsson

Morphometrics and the Muddle in the Middle:
Attributing Causes for Phenotypic Variation

10:30 – 11:00

Coffee

11:00 – 11:30

Aida
Gomez-Robles

Geometric Morphometric Approaches to Study
Brain Development and Evolution

11:30 – 12:00

Marta
Gómez Recio

Breathing motion analysis through
geometric morphometrics

12:00 – 12:30

Neus
Martínez-
Abadías

Multimodal Biomarkers for Disease Diagnosis:
Combining Shape, Genetic, and Clinical Data

12:30 – 14:00

Lunch

at the KLI

| Wednesday 17 September | Afternoon | From Integration to Error of Measurements |
|---------------------------|-----------------------|--|
| 14:00 – 14:30 | Dean Adams | Musings on Evaluating Integration and Modularity from Aligned Shapes |
| 14:30 – 15:00 | Michael Collyer | Compressed Likelihood for High-Dimensional Shape Models |
| 15:00 – 15:30 | Philipp Mitteröcker | What is Measurement Error in Biology? |
| 15:30 – 16:00 | Coffee | |
| 16:00 – 17:30 | Poster session | Elevator Pitches and lots of Discussion |
| 18:30 | Dinner | at Weingut Kerbl, Klosterneuburg |

| Thursday 18 September | Morning | Hot Topics Working Sessions |
|--------------------------|------------|-------------------------------------|
| 09:00 – 09:30 | Organizers | Introducing Thematic Working Groups |
| 09:30 – 10:30 | | Hands-On Thematic Working Groups |
| 10:30 – 11:00 | Coffee | |
| 11:00 – 12:30 | | Hands-On Thematic Working Groups |
| 12:30 – 14:00 | Lunch | at the KLI |

| Thursday 18 September | Afternoon | Hot Topics continued |
|--------------------------|-----------|---|
| 14:00 – 15:30 | | Hands-On Thematic Working Groups |
| 15:30 – 16:00 | Coffee | |
| 16:00 – 17:30 | | Software Clinic |
| Evening | Free Time | Explore Klosterneuburg, relax, or keep on working 😊 |

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| Friday 19 September | Morning | Recap and Outlook |
| 09:00 – 10:30 | | Working Group Presentations and Discussion |
| 10:30 – 11:00 | Coffee | |
| 11.00 – 11.30 | | Working Group Presentations and Discussion cont. |
| 11.30 – 12.30 | | General Discussion & Publication Plans |
| 12:30 – 14:00 | Lunch | at the KLI |
| 14:00 | Bus departure | for Natural History Museum Vienna, “Behind the Scenes” |
| 18:30 | Farewell Dinner | at Glacis Beisl, Museumsquartier, Vienna |
| 21:00 | Bus departure | for Hotel Anker, Klosterneuburg |

Participants

Dean Adams, Iowa State University, USA

Saudat Alishayeva, Max Planck Institute for Biology, Tübingen, Germany; KLI, Austria

Athi Baliso, University of Cape Town, Republic of South Africa

Markus Bastir, Museo Nacional de Ciencias Naturales, Madrid, Spain

Guillermo Bravo Morante, University of Zurich, Switzerland

Henry Camarillo, Yale University, USA; KLI Klosterneuburg, Austria

Andrea Cardini, Università di Modena e Reggio Emilia, Italy

Marion Chartier, University of Vienna, Austria

Michael Collyer, Chatham University, USA

Thomas Davies, University of Vienna, Austria

Pauline Fänder, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany

Barbara Fischer, KLI Klosterneuburg, Austria

Richard Gawne, Nevada State Museum, USA

Marta Gómez Recio, Museo Nacional de Ciencias Naturales, Madrid, Spain; KLI

Aida Gómez-Robles, University College London, UK

Philipp Gunz, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany

Nicole Grunstra, University of Vienna, Austria

Benedikt Hallgrímsson, University of Calgary, Canada

Martin Häusler, University of Zurich, Switzerland

Merin Joji, University of Copenhagen, Denmark; KLI Klosterneuburg, Austria

Anne Le Maître, KLI Klosterneuburg, Austria

Neus Martínez Abadías, University of Barcelona, Spain

Philipp Mitteröcker, University of Vienna; KLI Klosterneuburg, Austria

Gerd Müller, KLI Klosterneuburg, Austria

Sélim Natahi, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany

Paul O'Higgins, University of York, UK

Mihaela Pavličev, University of Vienna, Austria

Cathrin Pfaff, University of Vienna, Austria

Paolo Piras, CPIA 1 Roma, Italy

Eva Pletzenauer, University of Vienna, Austria

Anna Pytlik, University of Vienna, Austria
Aleksa Ratarac, University of Barcelona, Spain; KLI Klosterneuburg, Austria
F. James Rohlf, Stony Brook University, USA
Katrín Schäfer, University of Vienna, Austria
Stefan Schlager, University of Freiburg, Germany
Alexandra Schuh, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany
Petra Šimková, University of Vienna, Austria
Ekaterina Stansfield, University of Vienna, Austria
Kim Stroben, University of Vienna, Austria
Alessandro Urciuoli, University of Zurich, Switzerland
Jana Voglmayr, University of Vienna, Austria
Günter Wagner, Yale University; University of Vienna, Austria
Junya Watanabe, University of Barcelona, Spain
Sonja Windhager, University of Vienna, Austria
Eva Zaffarini, University of Calgary, Canada; KLI Klosterneuburg, Austria