



Biology of Butterflies 2023
PRAGUE, CZECH REPUBLIC
10-13 JULY 2023



**Final
Programme**

**Welcome Reception Partner
& Best Student presentation
at the congress Award Partner**



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Welcome letter

Dear participants,

Welcome to the 9th edition of the International Conference on the Biology of Butterflies, held in the beautiful city of Prague! We are delighted to have all of you here, representing different aspects of lepidopterological science from around the world. Whether you are a researcher, a student, or a conservationist, this conference offers a unique platform for sharing our research and practical experiences in a friendly and informal environment. We hope you will enjoy engaging in highly constructive exchanges during scientific sessions, as well as during coffee breaks and social events.

This renowned conference has a rich tradition of bringing together experts and enthusiasts from various subfields of lepidopterology. What sets the Biology of Butterflies Conference apart from other similar meetings is its remarkable range of topics, encompassing everything from systematics, ecology, and conservation to the genetic and molecular aspects of butterfly physiology, evolution, and development. Through informal discussions and thought-provoking presentations, this conference promises abundant opportunities for learning, sharing, and personal growth. Furthermore, I encourage you to take the opportunity to explore the numerous natural treasures in the surroundings of Prague, either through organized excursions or during your own independent trips, to enhance your overall experience.

I would like to express my sincere appreciation to all those who have played a crucial role in organizing this conference. From the dedicated local organizers and scientific committee members to the professional meeting organizers, countless volunteers, sponsors, and everyone involved in the planning process, their tireless efforts and unwavering commitment have made this event possible. I am truly grateful for their invaluable contributions, which have paved the way for this gathering of minds and the opportunity to delve into the captivating world of butterflies.

Get ready for an inspiring and fruitful conference where ideas will thrive, collaborations will flourish, and knowledge will expand. Together, let us make the most of this event and embrace the friendly atmosphere that characterizes our scientific community.

Warm regards



Robert Tropek

Main Organizer, Biology of Butterflies Conference 2023

Committees

Main Organizers:

Robert Tropek, Charles University, Prague

Tomáš Kadlec, Czech University of Life Sciences, Prague

Local Organizing Committee:

Robert Tropek, Charles University, Prague

Tomáš Kadlec, Czech University of Life Sciences, Prague

Terezie Arnoldová, National Institute of Public Health, Prague

Michal Barták, Charles University, Prague

Petr Nguyen, University of South Bohemia, České Budějovice

Sailee Sakhalkar, Charles University, Prague

Lenka Storchová, Charles University, Prague

Alena Sucháčková, Biology Centre CAS, České Budějovice

Scientific Committee:

Robert Tropek, Charles University, Prague, Czechia

Kwaku Aduse-Poku, Georgia State University, Decatur, USA

Hugo A. Benítez, Universidad Católica del Maule, Chile

Marianne Espeland, Leibniz Institute for the Analysis of Biodiversity Change – Museum Koenig, Bonn, Germany

Zdeněk Faltýnek Fric, Biology Centre CAS, České Budějovice, Czechia

Tomáš Kadlec, Czech University of Life Sciences, Prague, Czechia

Krushnamegh Kunte, National Centre for Biological Sciences, Bangalore, India

David Lohman, City College of New York, USA

Antonia Monteiro, National University of Singapore, Singapore

Petr Nguyen, University of South Bohemia, České Budějovice, Czechia

Piotr Skórka, Institute of Nature Conservation PAS, Krakow, Poland

Alena Sucháčková, Biology Centre CAS, České Budějovice, Czechia

Gerard Talavera, Botanical Institute of Barcelona (CSIC), Spain

Niklas Wahlberg, Lund University, Lund, Sweden

Excursion Organisers:

Tomáš Jor, Charles University, Prague

Tomáš Kadlec, Czech University of Life Sciences, Prague

Ondřej Sedláček, Charles University, Prague

Robert Tropek, Charles University, Prague

Advisory Board:

Krushnamegh Kunte, National Centre for Biological Sciences, India

Jens Roland, University of Alberta, Canada

Felix Sperling, University of Alberta, Canada

Dick Vane-Wright, University of Kent, UK

Niklas Wahlberg, Lund University, Sweden

Programme Overview

10 July 2023 (Monday)		
time/room	Atrium FŽP	Congress hall
09:00–09:50		Plenary talk – David Lohman
09:50–10:30	Coffee break	
10:30–12:30		Systematics I
12:30–13:30	Lunch	
13:30–16:00		Systematics II
16:00–16:45	Coffee break	
16:45–17:45		Systematics III
17:45–18:45		Plenary talk – Ondřej Sedláček
19:00–22:00	Welcome drink	

11 July 2023 (Tuesday)		
08:00–16:00	Excursions	

12 July 2023 (Wednesday)		
time/room	Atrium FŽP	Congress hall
09:00–09:50		Plenary talk – Hugo Benítez
09:50–10:30	Coffee break	
10:30–12:30		Phenotypic plasticity I
12:30–13:30	Lunch	
13:30–16:00		Phenotypic plasticity II
16:00–18:00	Poster session with coffee and refreshments	
19:00	Conference dinner (Boat)	

13 July 2023 (Thursday)		
time/room	Atrium FŽP	Congress hall
09:00–09:50		Plenary talk – Marianne Elias
09:50–10:30	Coffee break	
10:30–12:30		Vision and signalling I
12:30–13:30	Lunch	
13:30–15:30		Vision and signalling II
15:30–16:00	Coffee break	
16:00–17:00		Vision and signalling II
17:00–17:30		Closing Ceremony – Student Awards

10 July 2023 (Monday)		
Room ZI	Room ZII	time/room
		09:00–09:50
		09:50–10:30
Open topic	Colourful genetics	10:30–12:30
		12:30–13:30
Migration I	Communities I	13:30–16:00
		16:00–16:45
Migration II	Communities II	16:45–17:45
		17:45–18:45
		19:00–22:00
11 July 2023 (Tuesday)		
Excursions		08:00–16:00
12 July 2023 (Wednesday)		
Room ZI	Room ZII	time/room
		09:00–09:50
		09:50–10:30
Monitoring I	Conservation	10:30–12:30
		12:30–13:30
Monitoring II	Genome structure	13:30–16:00
		16:00–18:00
		19:00
13 July 2023 (Thursday)		
Room ZI	Room ZII	time/room
		09:00–09:50
		09:50–10:30
Climate change	Eco–evo–devo I	10:30–12:30
		12:30–13:30
Population genetics I	Eco–evo–devo II	13:30–15:30
		15:30–16:00
Population genetics II		16:00–17:00
		17:00–17:30

Detailed Programme

10 July 2023 (Monday)

09:00–09:50 Plenary talk
Congress Hall

David Lohman (USA): A global phylogeny of butterflies illuminates their evolutionary history, ancestral hosts, and biogeographic origins

09:50–10:30 Coffee Break

10:30–12:30 Scientific Symposia

Congress Hall

Systematics and biogeography of Lepidoptera: pattern and process (I)

Chaired by David J. Lohman and Pedro G. Ribeiro

10:30

Keynote talk

Pável Matos (Czech Republic): Bridging macro- and microevolutionary studies in Neotropical butterflies

11:00

Karina Silva-Brandao (Germany): Where? When? How? Patterns and processes on the biogeographic history of Acraeini butterflies

11:15

Jing Leong (USA): Diversification and biogeography of pantropical grass yellow butterflies (Pieridae: Coliadinae)

11:30

Tomasz Pyrcz (Poland): Phylogeny of the neotropical subtribe Pronophilina (Nymphalidae, Satyrinae) based on target enrichment and adult morphology

11:45

Rayner Nunez (Germany): Wing pattern, host plant use and genome skimming data suggest speciation in the Caribbean Metalmark, *Dianesia carteri* (Lepidoptera, Riodinidae)

12:00

Gael Kergoat (France): Habitat opening fostered diversity at both continental and local scales: impact of dispersal and habitat-shifts in the diversification of a speciose Afrotropical insect group

12:15

Andre Victor Lucci Freitas (Brazil): Neotropical montane butterflies: combining phylogeny, ecology and biogeography to understand patterns and processes

Room ZI**Open topic: the diverse traits and processes in Lepidoptera biology***Chaired by Anne Duploux and Vincent Debat*

10:30

Keynote talk**Denise Dalbosco Dell'Aglio** (UK): Shifting balances in the weighting of sensory modalities are predicted by divergence in brain morphology in incipient species of *Heliconius* butterflies

11:00

Camille Le Roy (the Netherlands): Gliding in the Amazonian canopy: adaptive evolution of flight in *Morpho* butterflies

11:15

Antonia Monteiro (Singapore): Lepidopteran prolegs are not leg homologs

11:30

Vincent Debat (France): Testing the role of flight in the evolution of butterfly wing tails: a combined macro-evolutionary and experimental analysis

11:45

Carlos Cordero (Mexico): Ejaculates in Lepidoptera: a hidden diversity

12:00

Anne Duploux (Finland): Infection with a male-killing *Spiroplasma* bacterium drives morphological changes in the African monarch butterfly

12:15

Mackenzie Hoogshagen (USA): The contributions of plant chemicals and monarch genetics to resistance against a virulent protozoan parasite**Room ZII****Colorful genetics of life history traits in Lepidoptera***Chaired by Joseph Hanly and Melanie Brien*

10:30

Keynote talk**Christopher Wheat** (Sweden): On the costs and benefits of pteridine co-option into Pieridae wings

11:00

Emilie Dion (Singapore): Yellow regulates courtship plasticity in butterflies

11:15

Joseph Hanly (USA): Visible and ultraviolet colours in an incipient species pair of *Colias* butterflies

11:30

Melanie Brien (Finland): A complex colour polymorphism is associated with a gene duplication in wood tiger moths

11:45

Kiana Kasmali (USA): The genes behind the scenes of visual mate preference in *Bicyclus anynana*

12:00

Luca Livraghi (USA): A clinal polymorphism at the optix locus drives differences in silver scale iridescence in Mormon Fritillaries12:30–13:30 **Lunch**

13:30–16:00 Scientific Symposia

Congress Hall

Systematics and biogeography of Lepidoptera:
pattern and process (2)

Chaired by David J. Lohman and Pedro G. Ribeiro

Keynote talk

- 13:30 **Nick Grishin** (USA): Insights from large-scale butterfly genomics
- 14:00 **Valentina Todisco** (Finland): So familiar, yet so unknown: Taxonomy and DNA barcoding of the Palearctic *Papilio machaon* species-group
- 14:15 **Vazrick Nazari** (Italy): High altitude isolation and speciation of butterflies in the Irano-Turanian mountain plateaus
- 14:30 **Leonardo Dapporto** (Italy): The genetic legacy of the Quaternary ice ages for West Palearctic butterflies
- 14:45 **Nok Ting Lam** (Finland): Genetic structure, phenotype and evolutionary history of butterflies in the European *Polyommatus eros* species group
- 15:00 **Vlad Dincă** (Finland): A new *Melitaea* butterfly endemic to the Balkans revealed by genomics
- 15:15 **Alena Sucháčková** (Czech Republic): Butterflies as ghosts of the mammoth steppe
- 15:30 **Aleix Palahí i Torres** (Sweden): Intra-specific transatlantic dispersal and species displacement explain Holarctic disjunct distributions in *Vanessa* butterflies
- 15:45 **Felix Sperling** (Canada): Species boundaries of *Phyciodes* butterflies (Lepidoptera: Nymphalidae) based on genomic integrity in a region of contact

Room Z1

Migration in butterflies: movement, physiology, interactions,
and genes (1)

Chaired by Gerard Talavera and Daria Shipilina

Keynote talk

- 13:30 **Gerard Talavera** (Spain): Migratory ecology and population dynamics of the Painted Lady butterfly, *Vanessa cardui*
- 14:00 **Aurora García-Berro** (Spain): A migratory divide for the Painted Lady butterfly (*Vanessa cardui*): A single genomic region differentiates populations in the two hemispheres
- 14:15 **Arne Weinhold** (Germany): Microbiota of adult butterflies – moving from spatial to temporal scales
- 14:30 **Emily Jones** (Hong Kong): Danaid migration in Asia – revealing the mystery of movement using URL-branded tags

14:45 **Thomas Gottschalk** (Germany): Where does the swallowtail fly?
– Results of a citizen science study at the Wurmlinger chapel
in Rottenburg, Germany

15:00 **Sana Ghouri** (Canada): Hydrogen and strontium isoscapes
for the African Palearctic range to reconstruct insect migration
and connectivity

15:15 **Megan Reich** (Canada): Isotope-based geographic assignment
provides valuable insights into long-distance butterfly
migration

15:30 **Daria Shipilina** (Sweden): Transcriptomic analysis reveals
pathways underlying response to environmental stress
in a migratory butterfly

Room ZII

Butterfly communities: Evolutionary assembly, ecological dynamics, and multi-trophic interactions (I)

Chaired by Krushnamegh Kunte and Marianne Elias

13:30 **Keynote talk**

Timothy Bonebrake (Hong Kong): Ecological uniqueness
of communities: controlling for environmental availability
highlights importance of insecticide for urban butterflies

14:00 **Saskya van Nouhuys** (India): The roles of parasitoids in butterfly
communities

14:15 **Tara Christensen** (USA): Nectar breadth and associations
with population trends in Sierra Nevada butterflies

14:30 **Violaine Llaurens** (France): Evolution of temporal niches
in butterfly communities and consequences on sympatric
speciation

14:45 **Gaurab Nandi Das** (Czech Republic): Geography of butterflies
of the Republic of India: Species richness and faunal
composition patterns revealed via check-lists of federal states

15:00 **Fernando Gaona** (Czech Republic): Brown and grey shades
of African savannahs: Understanding the direct and indirect
effects of the environment on moth communities in Kruger
National Park

15:15 **Robert Tropek** (Czech Republic): Seasonal shifts of biodiversity
patterns and species' elevation ranges of butterflies and moths
on Mount Cameroon

15:30 **Jessie Pereira Santos** (Brazil): From top to bounds: Forest
fragmentation emulates the vertical strata as a habitat filter
for butterfly assemblages

16:00–16:45 **Coffee Break**

16:45–17:45 **Scientific Symposia****Congress Hall****Systematics and biogeography of Lepidoptera: pattern and process (3)***Chaired by David J. Lohman and Pedro G. Ribeiro*

- 16:45 **Niklas Wahlberg** (Sweden): The evolutionary history of Lepidoptera: where are we?
- 17:00 **Eliette L. Reboud** (France): Inferring species-level phylogenies with whole-genome data: a new step in deciphering the taxonomy and history of the recalcitrant tribe Leptocircini (Papilionidae)
- 17:15 **Vladislav Ivanov** (Finland): Genomics reveals the genetic structure and cryptic diversity in *Pyrgus armoricanus*
- 17:30 **Marianne Espeland** (Germany): Opening up a treasure trove of color patterns and life histories: Phylogenetic relationships within the superfamily Zygaenoidea based on museomics

Room ZI**Migration in butterflies: movement, physiology, interactions, and genes (2)***Chaired by Gerard Talavera and Daria Shipilina*

- 16:45 **Keynote talk**
- Jacobus de Roode** (USA): Monarch butterfly migration: genomes, gene expression and parasites
- 17:15 **Mitchell Kendzel** (USA): Are Monarch butterflies true navigators: using agent-based and spatial modeling to explore animal navigation and migration

Room ZII**Butterfly communities: Evolutionary assembly, ecological dynamics, and multi-trophic interactions (2)***Chaired by Krushnamegh Kunte and Marianne Elias*

- 16:45 **Christina Baer** (USA): Evolutionary and ecological patterns of shelter-building across North American butterfly caterpillars
- 17:00 **Jens Roland** (Canada): Snow dominates dynamics of alpine *Parnassius smintheus* butterflies
- 17:15 **Klaus Fischer** (Germany): Dispersal barriers in Alpine populations of Copper butterflies

17:45–18:45 **Plenary talk**
Congress Hall

Ondřej Sedláček (Czech Republic): One wingbeat at a time: Restoring butterfly habitats and populations in the Czech Republic

19:00–22:00 **Welcome Drink**

11 July 2023 (Tuesday)

08:00–16:00 Excursions

More information about the Excursions on page 26

12 July 2023 (Wednesday)

09:00–09:50 Plenary talk Congress Hall

Hugo Benítez (Chile): Extreme adaptations, phenotype, geometry and other stories based on Lepidoptera

09:50–10:30 Coffee Break

10:30–12:30 Scientific Symposia

Congress Hall

Phenotypic plasticity in butterflies: from traits to their mechanisms and everything in between (I)

Chaired by *Erica Westerman, Madeleine Carruthers, and Océane Seudre*

10:30 Keynote talk

Ullasa Kodandaramaiah (India): Pupal colour plasticity in tropical butterflies

11:00 Katharina Schneider (Sweden): Flexible transcriptional response to host plant switches in the comma butterfly (*Polygonia c-album*)

11:15 Guilherme Atencio (Portugal): Developmental plasticity in multifactorial environments: temperature and food quantity effects on *Bicyclus anynana* wing patterns

11:30 Nadja Verspagen (Finland): Variation in developmental plasticity in a temperate butterfly across a latitudinal cline: connecting phenotype and transcriptome

11:45 Patricio Salazar-Carrión (UK): Local adaptation vs. phenotypic plasticity in traits associated with altitudinal adaptation in *Heliconius* butterflies

12:00 Yi Ting Ter (USA): Dynamic gene expression during a social learning event in a butterfly

12:15 Erica Westerman (USA): The neurogenomics of diversity in butterfly mate preference learning

TUESDAY

WEDNESDAY

Room ZI**Butterfly monitoring, trends and indicators: towards a global network (I)***Chaired by Monika Böhm, Chris van Swaay, Holly Mynott, Louise McRae, Sam Ellis, and David Roy*10:30 **Keynote talk****Krushnamegh Kunte** (India): Envisioning the Indian Butterfly Monitoring Scheme: Harnessing the power of a billion citizen scientists for tropical biodiversity monitoring and conservation11:00 **Jorge L. León-Cortés** (Mexico): Butterfly monitoring in southern Mexico: challenges and prospects11:15 **Leslie Ries** (USA): Tracking butterfly distributions over 200 years in American north of Mexico11:30 **Chooi-Khim Phon** (Malaysia): Butterfly monitoring in Peninsular Malaysia: Experiences, challenges and the way forward11:45 **Oskar Brattström** (UK): The Nigeria Butterfly Network: Towards the establishment of a nationwide Nigerian butterfly monitoring programme12:00 **Guy Pe'er** (Germany): The Israeli Butterfly Monitoring Scheme (BMS-IL): what happens to species at the desert's edge?12:15 **Yuet Fung Ling** (Hong Kong): Long-term butterfly monitoring reveals climate-driven community restructuring with tropical species gains in a subtropical Hong Kong reserve**Room ZII****Conservation of butterflies and their habitats***Chaired by Piotr Skorka and Federico Riva*10:30 **Keynote talk****Thomas Schmitt** (Germany): Mark-release-recapture of eleven butterfly species unravels different conservation needs11:00 **Ádám Kőrösi** (Germany): How much "nature" do we need in agricultural landscapes to preserve butterflies?11:15 **Irma Wynhoff** (the Netherlands): Restoring habitats of the myrmecophilous butterfly *Phengaris (Maculinea) teleius* on former agricultural fields by sod translocation11:30 **Piotr Skorka** (Poland): The value of novel habitats for conservation of butterflies – a short review11:45 **Martin Wiemers** (Germany): Conserving Madeira's threatened endemic butterflies12:00 **Heiko Hinneberg** (Germany): How to promote the Southern White Admiral? – Scientific evidence for a species conservation plan12:15 **Cas Carroll** (USA): Status and conservation of a rare, endangered Great Basin Skipper (Nevada and California, USA)12:30–13:30 **Lunch**

13:30–16:00 Scientific Symposia

Congress Hall

Phenotypic plasticity in butterflies: from traits to their mechanisms and everything in between (2)

Chaired by Erica Westerman, Madeleine Carruthers, and Océane Seudre

- 13:30 **Matthew Nielsen** (Germany): Connecting plasticity across life stages
- 13:45 **Rachel Steward** (Sweden): Genetic constraints in genes exhibiting splicing plasticity in facultative diapause
- 14:00 **Shen Tian** (Singapore): Hox gene *Antennapedia* potentially regulates butterfly eyespot size plasticity
- 14:15 **Carly Lynsdale** (Finland): Is it hot in here? How thermal stress drives life-history variation, and the physiological mechanisms of this, in *Cinxia* butterflies
- 14:30 **Grace E. Hirzel** (USA): Covariation in wing color, behavior, and sensory gene expression in a seasonally plastic butterfly
- 14:45 **Madeleine Carruthers** (UK): Seasonal plasticity in the African butterfly *Bicyclus anynana* is facilitated by substantial shifts in regulatory molecular mechanisms
- 15:00 **Raghavendra Kudinalli Nagaraj** (UK): Unravelling the Molecular Mechanisms of Adaptive Seasonal Plasticity in *Bicyclus anynana* Using Co-Expression Networks
- 15:15 **Freerk Molleman** (Poland): Are plastic responses to temperature, humidity, and host plant mediated by larval growth in the seasonally polyphenic butterfly *Melanitis leda*?
- 15:30 **Keynote talk**
Delbert Green II (USA): Long distance migration as a driver of sensory plasticity and evolution in monarch butterflies

Room Z1

Butterfly monitoring, trends and indicators: towards a global network (2)

Chaired by Monika Böhm, Chris van Swaay, Holly Mynott, Louise McRae, Sam Ellis, and David Roy

- 13:30 **Keynote talk**
Chris van Swaay (the Netherlands): From national to Continental to Global Butterfly Monitoring
- 14:00 **Cristina G. Sevilleja** (the Netherlands): Citizen science approaches for developing Butterfly Monitoring Schemes in Europe
- 14:15 **Andrea Büermann** (Germany): VielFalterGarten – Citizen Science for monitoring and conserving urban butterfly populations
- 14:30 **Shao-Ji Hu** (China): Integrating DNA barcodes into Butterfly Monitoring Network

- 14:45 **Shawan Chowdhury** (Germany): Social media records hold valuable information for conservation planning
- 15:00 **Eliza Grames** (USA): Butterflies of western North America: trends, stressors, and prioritization for conservation
- 15:15 **Federico Riva** (the Netherlands): Spatial, temporal, and taxonomic trends from butterfly monitoring programs
- 15:30 **Katherine Bell** (USA): On the detectability of climate change impacts on insect populations: An individual-based simulation approach to explore monitoring design and variation in weather effects

Room ZII

Genome structure and evolution

Chaired by *Petr Nguyen and James R. Walters*

Keynote talk

- 13:30 **Charlotte Wright** (UK): Winging it: Understanding genome instability in *Polyommatus*
- 14:00 **Jesper Boman** (Sweden): What can we learn about chromosomal speciation in butterflies from studying *Leptidea*?
- 14:15 **Karin Näsval** (UK): Recombination rate differences as a consequence of chromosomal rearrangements
- 14:30 **Héloise Muller** (France): Genome architecture in the holocentric silkworm *Bombyx mori* and related species
- 14:45 **Petr Nguyen** (Czech Republic): Strange genome architecture in ghost moths (Hepialidae)
- 15:00 **Chay Graham** (UK): Insights into early stages of sex chromosome evolution from a novel neoW chromosome in the African Monarch Butterfly, *Danaus chrysippus*
- 15:15 **Thomas Decroly** (UK): Neo-W degradation locally rescued by rare recombination events in the Spanish marbled white butterfly
- 15:30 **James Walters** (USA): Assembly and characterization of the W chromosome in monarch butterfly (*Danaus plexippus*)
- 15:45 **Arjen Van t Hof** (Czech Republic): A novel sex determination mechanism in a satyrid butterfly

16:00–18:00 Poster session (with coffee and refreshments)

19:00–22:00 Conference dinner (City centre)

13 July 2023 (Thursday)

09:00–09:50 Plenary talk
Congress Hall
Marianne Elias (France): The drivers of biodiversity in the Neotropics: insights from mimetic clearwing butterflies

09:50–10:30 Coffee Break

10:30–12:30 Scientific Symposia

Congress Hall

Vision and signalling in butterflies (1)

Chaired by Gregor Belušič and Kentaro Arikawa

10:30 Kentaro Arikawa (Japan): Sexually dimorphic pierid eyes

10:45 Adriana Briscoe (USA): Sex-linked gene traffic underlies the acquisition of sexually dimorphic UV color vision in *Heliconius* butterflies

11:00 Keynote talk

Gregor Belušič (Slovenia): Design, function and evolutionary patterns of red receptors in nymphalid butterflies

11:30 Primož Pirih (Austria): Ecology and phylogeny of butterflies as seen through the eyeshine

11:45 Sridhar Halali (Sweden): Strong phylogenetic inertia drives diversification of eye size in butterflies

12:00 Anupama Nayak Manel (Germany): Divergence of visual acuity in *Heliconius* butterflies

12:15 Matthew Murphy (USA): Potential evolutionary tradeoffs between the development of visual and central nervous systems among butterflies

Room ZI

Butterfly diversity under climate change

Chaired by Valentina Todisco and Joseph Williamson

10:30 Keynote talk

Jan Christian Habel (Austria): Range shifts of butterflies from past to future

11:00 Joseph Williamson (UK): Predicting sudden and widespread biodiversity loss on a rapidly warming planet: when and where does biology change things?

11:15 Grace Horne (USA): Long-term datasets reveal climatic nuance in moth responses to global change

11:30 Clare Dittmore (USA): Three ladies and an admiral: exploring Vanessa response to climate change across multiple decades and a steep elevational gradient

THURSDAY

- 11:45 **Dubi Benyamini** (Israel): Zoogeographical changes in the Israeli butterflies during the last 33 years indicate climate change trends in the Middle East
- 12:00 **Victor Brans** (Belgium): What drives (meta)population dynamics of the bog fritillary butterfly? The relative importance of habitat quality, parasitism, and climate

Room ZII

Eco-evo-devo of lepidopteran color patterns (1)

Chaired by Patrícia Beldade, Antónia Monteiro, and Jocelyn Wee

- 10:30 **Agathe Puissant** (France): Convergence in sympatric swallowtail butterflies reveals ecological interactions as a key driver of worldwide trait diversification
- 10:45 **Tarunkishwor Yumnam** (India): False head: evolution of another head in butterflies
- 11:00 **Indukala Prasannakumar** (India): Does growth rate influence eyespot size? – A comparative study of three sympatric satyrine butterflies
- 11:15 **Rachel Thayer** (USA): A meta-analysis of butterfly structural colors: color range and phylogenetic distribution
- 11:30 **Victoria Lloyd** (UK): The actin cytoskeleton plays multiple roles in structural colour formation in butterfly wing scales
- 11:45 **Anupama Prakash** (UK): Developmental differences between iridescent and non-iridescent scale nanostructures in *Heliconius sara* butterflies
- 12:00 **Kyle A DeMarr** (USA): Cytoskeletal contributions to scale shape and the evolution of wing transparency
- 12:15 **Anna-Lee Jessop** (Australia): Elucidating the development of structural colour in butterflies using hyperspectral microscopy

12:30–13:30 **Lunch**

13:30–15:30 **Scientific Symposia**

Congress Hall

Vision and signalling in butterflies (2)

Chaired by Gregor Belušič and Kentaro Arikawa

Keynote talk

- 13:30 **Nicola Nadeau** (UK): The genetic basis of structural colour variation in mimetic *Heliconius* butterflies
- 14:00 **Richard Merrill** (Germany): Adaptive exchange of a regucalcin drives the evolution of visual mating preference in *Heliconius* butterflies
- 14:15 **Juliana Sosa** (the Netherlands): Visual signal modulation in *Morpho* butterflies: the role of lamellar angles in the permanence of iridescent displays

- 14:30 **Joséphine Ledamoisel** (France): Testing the coevolution between the diversity of iridescence and visual discrimination in *Morpho* butterflies
- 14:45 **Sanni Silvasti** (Australia): Dynamic visual signals in the common grass yellow butterflies
- 15:00 **Zahra Moradinour** (Sweden): How variations in light habitats reflect on visual traits and visual adaptations in three different butterfly species?
- 15:15 **Naomi Pierce** (USA): Visualizing butterflies and moths: using data from a novel, high throughput, multi-spectral imaging system

Room ZI

Population, landscape, and conservation genetics of butterflies (1)

Chaired by *Alena Sucháčková and Caroline Kebaili*

Keynote talk

- 13:30 **Jérémy Gauthier** (Switzerland): Museomics to retrace the decline of butterfly populations throughout the 20th century
- 14:00 **Marjo Saastamoinen** (Finland): Role of genetics in impacting population persistence under variable environments
- 14:15 **Caroline Kebaili** (France): Human and climatic impact on four emblematic species of butterflies in Franche-Comté and implications for conservation management
- 14:30 **Zachary Nolen** (Sweden): Does the human altered landscape isolate butterfly populations?
- 14:45 **Emily Heffernan** (USA): Population genetics and rangewide dynamics of the threatened prairie butterfly, *Hesperia dacotae*
- 15:00 **Valéria Marques** (Spain): Allopatric and ecological diversification in *Cyaniris semiargus* (Lepidoptera, Lycaenidae)
- 15:15 **Loukia Spilani** (Spain): Phylogeography and conservation of *Melitaea diamina* (Lepidoptera, Nymphalidae): southern relict populations trapped by climate change

Room ZII

Eco-evo-devo of lepidopteran color patterns (2)

Chaired by *Patrícia Beldade, Antónia Monteiro, and Jocelyn Wee*

- 13:30 **Limin Wang** (Austria): Speculations on specularity: gold and bronze to moths, silver to butterflies
- 13:45 **Martik Chatterjee** (USA): Transcription factor bric-a-brac regulates known pigmentation, patterning and scale structure genes across Lepidoptera
- 14:00 **Kalle Tunström** (Sweden): Deciphering the evolution of sex-limited butterfly wing color polymorphisms
- 14:15 **Eva van der Heijden** (UK): Genetics of a mimicry ring switch in ithomiine butterflies

- 14:30 **Anna Orteu** (UK): Transposable element insertions are associated with Batesian mimicry in the pantropical butterfly *Hypolimnys misippus*
- 14:45 **Tirtha Banerjee** (Singapore): Spatial and temporal regulation of Wnt signaling pathway members in the development of butterfly eyespots
- 15:00 **Anyi Mazo Vargas** (USA): 'Fluttering' with Wnt signals: Insights on the Papilionidae wing color ground plan
- 15:15 **Suriya Narayanan Murugesan** (Singapore): Novel traits that emerge from the co-option of pre-existing gene regulatory networks make widespread use of pleiotropic enhancers

15:30–16:00 **Coffee Break**

16:00–17:00 **Scientific Symposia**

Congress Hall

Vision and signalling in butterflies (3)

Chaired by Gregor Belušič and Kentaro Arikawa

- 16:00 **Marilia Fernandes Erickson** (Australia): Why are aposematic signals so effective but so rare?
- 16:15 **Erika Pérez V.** (France): Ecology and evolution of evasive mimicry in butterflies: insights from the diverse Neotropical genus *Adelpha*
- 16:30 **Tsuyoshi Takeuchi** (Japan): Uncertain mate recognition forms social behaviours and conspicuous traits of butterflies
- 16:45 **Daniel Linke** (Czech Republic): Anti-predator defences of neotropical skippers (Hesperiidae), more complex than previously thought

Room Z1

Population, landscape, and conservation genetics of butterflies (2)

Chaired by Alena Sucháčková and Caroline Kebaïli

- 16:00 **Joana Meier** (UK): Hybridisation and chromosomal rearrangements speed up adaptation and speciation
- 16:15 **Pedro Ribeiro** (Czech Republic): Genomic data reveals strong differentiation of populations in co-occurring sister *Spicauda* species (Hesperiidae)
- 16:30 **Mukta Joshi** (Finland): Species delimitation under allopatry – Patterns of intraspecific genomic divergences within and across the continents in Lepidoptera

17:00–17:30 **Closing ceremony, Student awards**

Status as of 27 June 2023.
Programme subject to change.

List of Posters

Butterfly communities

P-01

Michal Barták (Czech Republic): The importance of moth pollination in tropical ecosystems

P-02

Roman Modlinger (Czech Republic): Lepidopteran fauna of natural mountain spruce forest in the Trojmezna (Šumava: Czechia)

Butterfly diversity under climate change

P-03

Laura Torrado-Blanco (Spain): Past, present, and future of the NW Spanish montane endemism *Erebia palarica* Chapman, 1905

Butterfly monitoring, trends and indicators

P-04

Holly Mynott (UK): Building a Global Butterfly Index

P-05

Kata Pásztor (Hungary): How weather and body size affect survival, senescence and detectability in a natural butterfly population

P-06

David Roy (UK): The potential of timed area counts for monitoring butterfly populations across Europe

P-07

Jan Walter (Czech Republic): What functional traits of moths determine anthropogenic habitats?

Conservation of butterflies and their habitats

P-08

Taylor Bradford (USA): Chasing butterflies across the sands: towards an understanding of population density and habitat use by the Sand Mountain Blue

P-09

Tomáš Jor (Czech Republic): Five years of reintroduction of Chapman's Blue in Prague

P-10

Tomasz Suchan (Poland): Conservation of *Parnassius apollo* in Poland, Czech Republic and Austria (LIFE APOLLO2020)

Eco-evo-devo of lepidopteran color patterns

P-11

Keity J. Farfán-Pira (USA): Exploring genetic variability and its potential influence on wing color patterning in *Bicyclus anynana* butterflies: A focus on allelic variance

P-12

Brian Hanotte (Singapore): Speak for the trees: Phylogenetic mapping of eyespots across multiple superfamilies of Lepidoptera

P-13

Jocelyn Wee (Singapore): The genetic basis of wing spots in *Pieris canidia* butterflies

Genome structure and evolution

P-14

Monika Hospodářská (Czech Republic): A role of sexually antagonistic selection in sex chromosome evolution of a common blue *Polyommatus icarus* (Lycaenidae)

P-15

Monika Hrubá (Czech Republic): Development of molecular markers for the W chromosome in the blue butterfly *Polyommatus icarus*

P-16

Eduardo Marabuto (Germany): Museomics to understand the phylogenetic relationships and wing-pattern evolution of burnet moths (*Zygaena*)

P-17

Peter Mulhair (UK): Order-wide dynamics of gene evolution across lepidopteran genomes

P-18

Tan Pham Nhat (Poland): Genomics of local adaptation in the widespread butterfly *Melanitis leda*

Migration in butterflies

P-19

Roger López Mañas (Spain): Species Distribution Modelling and Remote Sensing Vegetation Indices to study migratory butterfly seasonal movements and population outbreaks

P-20

Ulla Riihimäki (Finland): How does landscape structure affect butterfly flight capability?

Open topic

P-21

Joaquin Baixeras (Spain): A little-known dimension of genital diversity in female Lepidoptera: the bursa muscularis

P-22

Sneha Bhansali (Germany): Evolution of wing pattern in the *Zygaena manlia* group using machine learning and phylogenomics

P-23

Urszula Walczak (Poland): Winter moths on co-occurring oaks and hornbeams are isolated by adaptation to budburst phenology

Phenotypic plasticity in butterflies

P-24

Marcus Hicks (UK): How do *Panacea prola* and other Amazonian butterflies adapt to natural seasonal cycles and how will this help them to cope with anthropogenic climate change?

P-25

Elisabeth Magera (USA): Effect of mating on male choosiness in *Bicyclus anynana*

P-26

Gowri V (Singapore): Novel food odor learning across generations and inheritance of learned odor preference via hemolymph transfusions in *Bicyclus anynana* butterfly larvae

Population, landscape, and conservation genetics

P-27

Marta Vila (Spain): Census and contemporary effective population size of a population of *Erebia palarica*, Chapman, 1905

Systematics and biogeography of Lepidoptera

P-28

Svenja Sabine Ahlborn (Germany): Diversification of phyto-predaceous lycaenid butterflies (Polyommatainae, Lycaenidae) during the Miocene aridification of the African continent

P-29

Noémie Hévin (France): Bayesian total-evidence dating under the fossilized birth-death process illuminates the age and historical biogeography of Apollo butterflies

P-30

Sonal Ladwa (UK): Using Museum specimens to analyse the effect of altitude and other ecological correlates on neotropical Nymphalid butterfly wing colouration

P-31

Tabitha R. Taberer (UK): Investigating the evolutionary relationships of the pantropical moth genus *Parasa*

Vision and signalling in butterflies

P-32

Aswathy Nair (Singapore): The role of sound in courtship and male-male competition in *Bicyclus anynana* butterflies



Conference information

Venue

Czech University of Life Sciences Prague (CZU)

Kamýčká 129

165 00 Praha – Suchbát

Czech Republic

Library

- Congress Hall
- Registration

Faculty of Environmental Sciences

- Rooms ZI, ZII
- Lunch, Coffee breaks and Welcome drink are located in the foyer and on the 1st floor
- Poster Session on the 1st floor

Conference Secretariat

GUARANT International

Českomoravská 19

190 00 Prague 9

Czech Republic

Phone: +420 284 001 444

E-mail:

biologybutterflies@guarant.cz

(contact for formal issues, registration questions, payments, accommodation at dormitories etc.)

biologyofbutterflies@gmail.com

(contact for scientific program, excursions, deadlines etc.)

Registration openings

Monday, 10 July 2023	08:00–19:00
Tuesday, 11 July 2023	closed
Wednesday, 12 July 2023	08:30–18:00
Thursday, 13 July 2023	08:30–17:30

Speaker-ready openings

Speaker-ready is located in each presentation room.

Monday, 10 July 2023	08:30–19:00	Congress Hall
	10:00–17:45	Rooms ZI, ZII
Wednesday, 12 July 2023	08:30–16:00	Congress Hall
	10:00–16:00	Rooms ZI, ZII
Thursday, 13 July 2023	08:30–17:30	Congress Hall
	10:00–17:00	Rooms ZI, ZII

Social events

Welcome drink

Date: Monday, 10 July 2023

Duration: 19:00–22:00 (3 hours)

Location: conference venue – Faculty of Environmental Sciences

Conference dinner

Evening Cruise on Vltava River

Date: Wednesday, 12 July 2023

Duration: 18:50–23:00 (4 hours)

Meeting and return point:

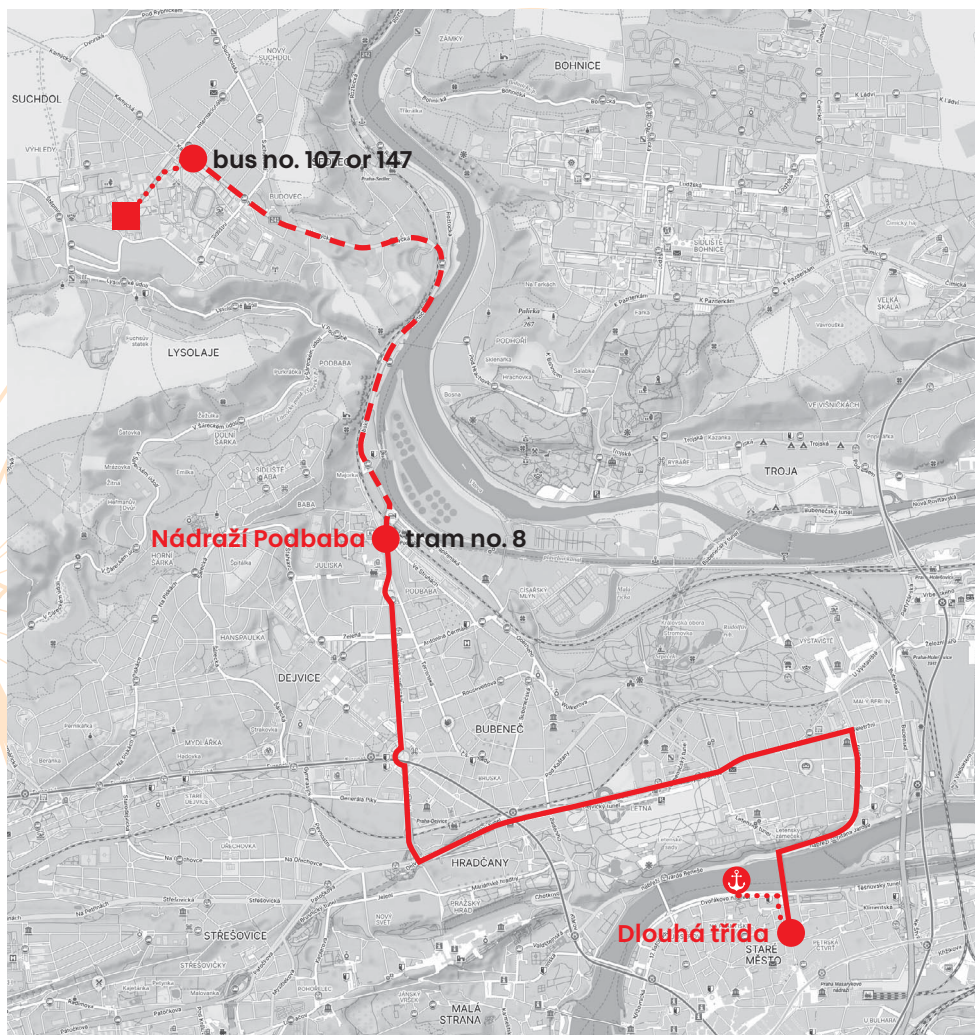
Na Františku embankment, pier no. 15, Prague 1 (opposite the St. Agnes Convent). Meeting point is at 18:35. Please arrive at the meeting point 10 minutes in advance. The boat departs at 18:50 and there will be no waiting for latecomers. Transfer to the dinner and to the hotel is not provided.

It will be possible to disembark from the boat at 22:30 when it returns to the pier.

The evening will accompany a jazzrock'n'roll band Kronos Combo.

How to reach the Conference dinner:

From the conference venue, take a bus number 107 or 147 (direction “Dejvická”) to the stop “Nádraží Podbaba” and there change to tram number 8 (direction “Starý Hloubětín”) to the tram stop “Dlouhá třída”. From there go straight to the riverside and there on the left, you will see the boat “EUROPE”. The journey takes about 45 minutes.



Excursions

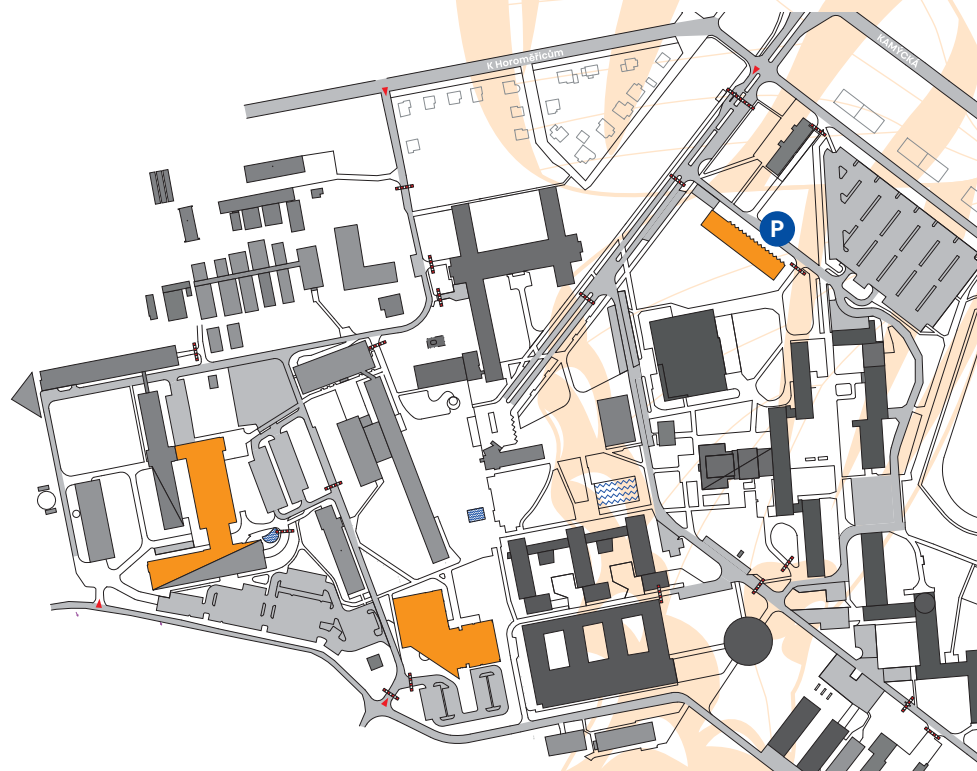
Date: Tuesday, 11 July 2023

Duration: 08:00–16:00

Meeting point: 07:45 at the parking lot in front of the dorm A
The lunch packages will be distributed in the bus.

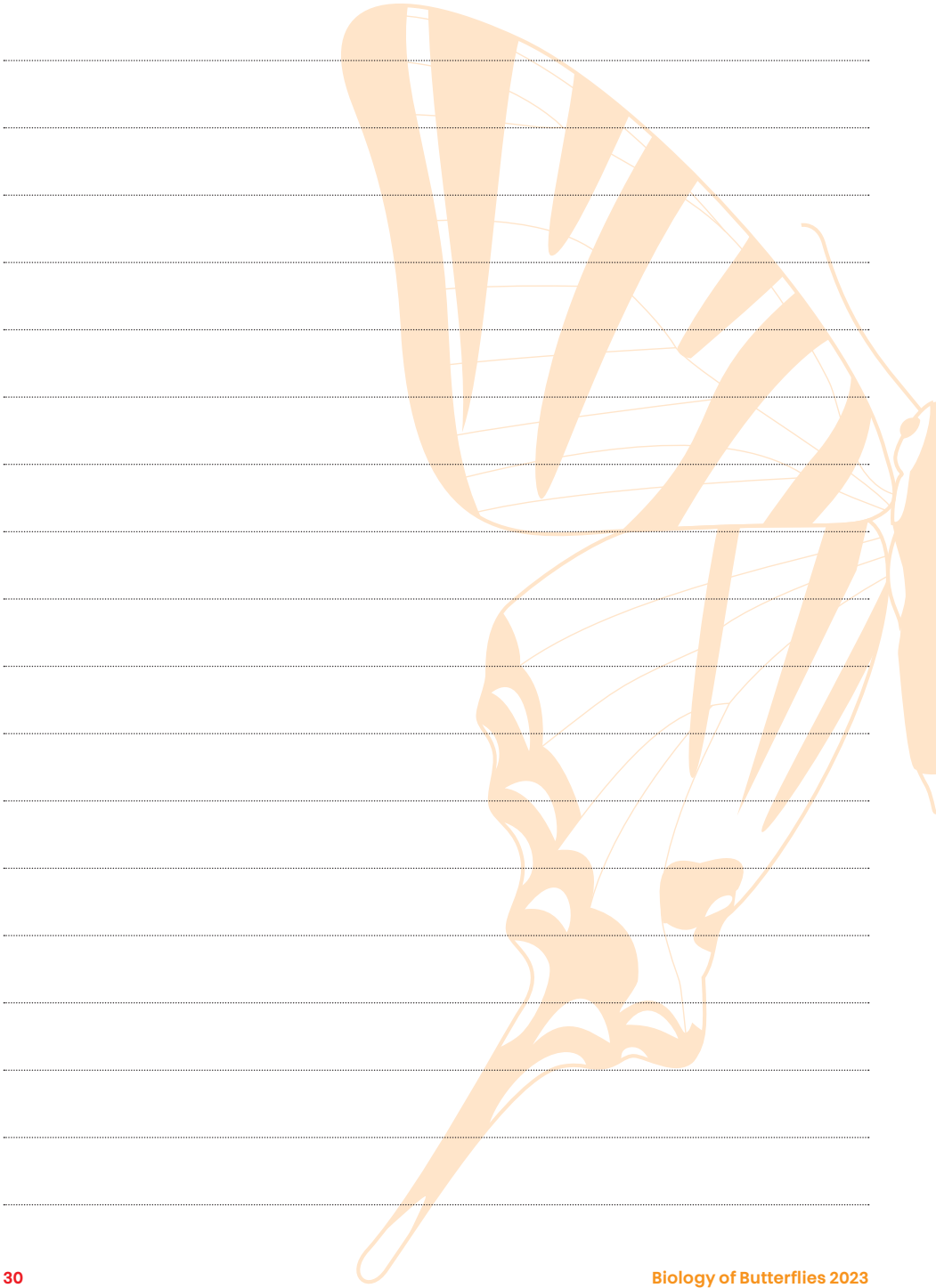
Excursions:

- Rewilding for biodiversity: Large ungulates in abandoned military areas
- Fragmented biodiversity refuge: Species-rich grasslands in an agricultural region
- More than the city: Biodiversity hotspot in Prague
- Traditional landscape: Restoration of a karstic area



Notes

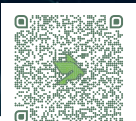






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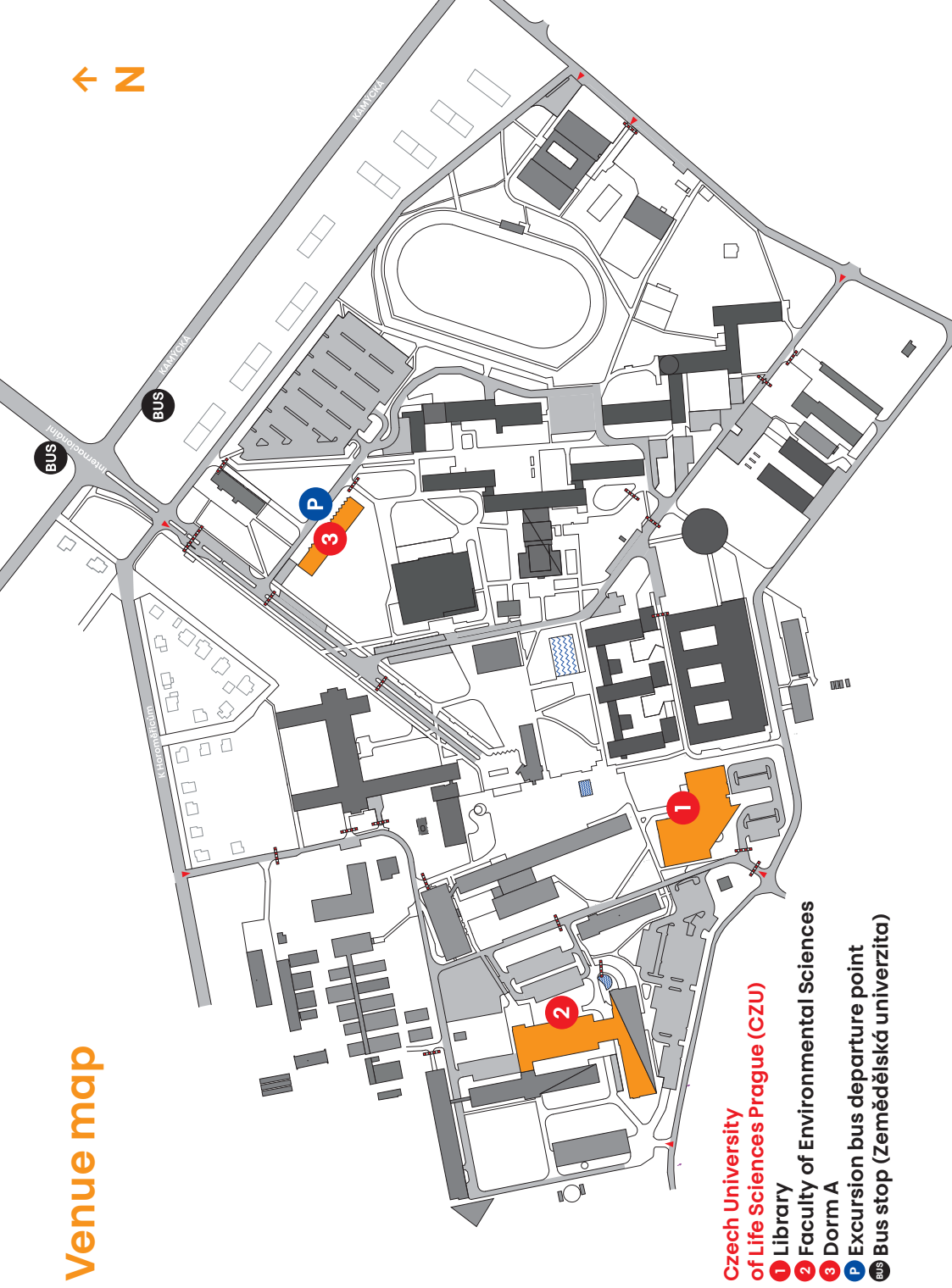
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Venue map



**Czech University
of Life Sciences Prague (CZU)**

- 1** Library
- 2** Faculty of Environmental Sciences
- 3** Dorm A
- P** Excursion bus departure point
- BUS** Bus stop (Zemědělská univerzita)