


# Dimitrios – Georgios **Kontopoulos**

POSTDOCTORAL RESEARCHER

LOEWE Centre for Translational Biodiversity Genomics & Senckenberg Research Institute, Frankfurt, Germany

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I am an integrative biologist. My research focuses on understanding **how diverse biological systems (from molecules to ecosystems) respond to environmental changes over various timescales**. I approach this goal using approaches from a wide range of fields, including ecoinformatics, phylogenetic comparative methods, comparative genomics, and molecular dynamics simulations.

## Research appointments and internships

- **Postdoctoral researcher at Prof. Michael Hiller's group**, LOEWE Centre for Translational Biodiversity Genomics, Senckenberg Research Institute, Frankfurt, Germany **May 2021 - Present**
- **Visiting researcher**, Imperial College London, Silwood Park, Ascot, United Kingdom **Dec. 2019 - Apr. 2021**
- **Research assistant at Dr. Samraat Pawar's group**, Imperial College London, Silwood Park, Ascot, United Kingdom **Oct. 2015 - Sep. 2016**  
**Nov. 2014 - May 2015**
- **Postgraduate intern at Dr. Sofia Kossida's group**, Bioinformatics and Medical Informatics Lab of the Biomedical Research Foundation of the Academy of Athens, Athens, Greece. **Nov. 2012 - Sep. 2013**
- **Summer intern at Prof. Marie-Paule Lefranc's group**, Laboratoire d'ImmunoGénétique Moléculaire of the Institut de Génétique Humaine, Montpellier, France. **May - June 2013**
- **Summer intern at Prof. Zissis Mamuris' group**, Laboratory of Genetics, Comparative and Evolutionary Biology of the Department of Biochemistry and Biotechnology of the University of Thessaly, Larissa, Greece. **July 2011**
- **Intern at Dr. George Skavdis' group**, Laboratory of Molecular Regulation of the Department of Molecular Biology and Genetics of the Democritus University of Thrace, Alexandroupolis, Greece. **Mar. - May 2010**


## Education

- **Imperial College London**, Silwood Park, Ascot, United Kingdom **Oct. 2015 - Dec. 2019**  
**PhD:** "Limits to thermal adaptation in ectotherms"
- **Imperial College London**, Silwood Park, Ascot, United Kingdom **Sep. 2013 - Sep. 2014**  
**MRes Biodiversity Informatics and Genomics**, graduated with Distinction.  
**Thesis:** "Phylogenetic constraints and environmental drivers of thermal adaptation among the phytoplankton"
- **Democritus University of Thrace**, Alexandroupolis, Greece **Sep. 2008 - Oct. 2012**  
**BSc Molecular Biology and Genetics**, graduated with 7.46/10 ("Very Well").  
**Thesis:** "Pinda: a gene duplication detection program"


## Publications

**Peer-reviewed papers** († equal contribution; ✉ corresponding author)







- 15 Kontopoulos, D.-G.** ✉, Sentis, A., Daufresne, M., Glazman, N., Dell, A.I., & Pawar, S. (2024) No universal mathematical model for thermal performance curves across traits and taxonomic groups. *Nature Communications*, in press. Preprint available from bioRxiv: [doi:10.1101/2023.09.08.556856](https://doi.org/10.1101/2023.09.08.556856).
- 14 Pawar, S.** ✉, Huxley, P.J. ✉, Smallwood, T.R.C., Nesbit, M.L., Chan, A.H.H., Shocket, M.S., Johnson, L.R., **Kontopoulos, D.-G.**, & Cator, L.J. ✉ (2024) [Variation in temperature of peak trait performance constrains adaptation of arthropod populations to climatic warming](#). *Nature Ecology & Evolution*. 8:500-510.

- 13 Kirilenko, B.M., Munegowda, C., Osipova, E., Jebb, D., Sharma, V., Blumer, M., Morales, A.E., Ahmed, A.-W., **Kontopoulos, D.-G.**, Hilgers, L., Lindblad-Toh, K., Karlsson, E.K., Zoonomia Consortium, & Hiller, M.  (2023) [Integrating gene annotation with orthology inference at scale](#). *Science*. 380(6643):eabn3107.
- 12 Smith, T.P. , Mombrikotb, S., Ransome, E., **Kontopoulos, D.-G.**, Pawar, S., & Bell, T. (2022) [Latent functional diversity may accelerate microbial community responses to temperature fluctuations](#). *eLife*. 11:e80867.
- 11 Kordas, R.L., Pawar, S., **Kontopoulos, D.-G.**, Woodward, G., & O’Gorman, E.J.  (2022) [Metabolic plasticity can amplify ecosystem responses to global warming](#). *Nature Communications*. 13:2161.
- 10 **Kontopoulos, D.-G.** , Smith, T.P., Barraclough, T.G., & Pawar, S. (2020) [Adaptive evolution shapes the present-day distribution of the thermal sensitivity of population growth rate](#). *PLOS Biology*. 18(10):e3000894.
- 9 **Kontopoulos, D.-G.** , van Seville, E., Lange, M., Yvon-Durocher, G., Barraclough, T.G., & Pawar, S. (2020) [Phytoplankton thermal responses adapt in the absence of hard thermodynamic constraints](#). *Evolution*. 74(4):775-790. **[Top Cited Article 2020-2021 in Evolution]**
- 8 García-Carreras, B. , Sal, S., Padfield, D., **Kontopoulos, D.-G.**, Bestion, E., Schaum, C.-E., Yvon-Durocher, G., & Pawar, S.  (2018) [Role of carbon allocation efficiency in the temperature dependence of autotroph growth rates](#). *Proceedings of the National Academy of Sciences*. 115(31):E7361-E7368.
- 7 Kumbhar, R., Vidal-Eychenié, S., **Kontopoulos, D.-G.**, Larroque, M., Larroque, C., Basbous, J., Kossida, S., Ribeyre, C., & Constantinou, A.  (2018) [Recruitment of ubiquitin-activating enzyme UBA1 to DNA by poly\(ADP-ribose\) promotes ATR signalling](#). *Life Science Alliance*. 1(3):e201800096.
- 6 **Kontopoulos, D.-G.** , García-Carreras, B., Sal, S., Smith, T.P., & Pawar, S. (2018) [Use and misuse of temperature normalisation in meta-analyses of thermal responses of biological traits](#). *PeerJ*. 6:e4363.
- 5 **Kontopoulos, D.-G.** , Kontopoulou, T., Ho, H.-C., & García-Carreras, B. (2017) [Towards a theoretically informed policy against a rakghoul plague outbreak](#). *The Medical Journal of Australia*. 207(11):490-494. **[Third place in the 2017 Christmas Competition of the Medical Journal of Australia]**
- 4 **Kontopoulos, D.-G.** , Vlachakis, D. , Tsiliki, G., & Kossida, S. (2016) [Structuprint: a scalable and extensible tool for two-dimensional representation of protein surfaces](#). *BMC Structural Biology*. 16:4.
- 3 Kontopoulou, T. , **Kontopoulos, D.-G.** , Vaidakis, E., & Mousoulis, G.P. (2015) [Adult Kawasaki disease in a European patient: a case report and review of the literature](#). *Journal of Medical Case Reports*. 9(1):75.
- 2 Vlachakis, D., **Kontopoulos, D.-G.**, & Kossida, S.  (2013) [Space Constrained Homology Modelling: the paradigm of the RNA-dependent RNA polymerase of dengue \(type II\) virus](#). *Computational and Mathematical Methods in Medicine*. 2013:108910.
- 1 **Kontopoulos, D.-G.** & Glykos, N.M.  (2013) [Pinda: a web service for detection and analysis of intraspecies gene duplication events](#). *Computer Methods and Programs in Biomedicine*. 111(3):711-714.


### Invited book chapters

- 1 **Kontopoulos, D.-G.**  Phylogenetic comparative approaches for the study of biological scaling. In: Synthesizing biological scaling: towards a universal theory. Santa Fe Institute Press. *In press*.

### Manuscripts under review

- 2 **Kontopoulos, D.-G.** , Levesque, D.L., & Hiller, M.  Numerous independent gains of torpor and hibernation across endotherms, linked with adaptation to diverse environments. Available from bioRxiv: [doi:10.1101/2023.12.12.571278](https://doi.org/10.1101/2023.12.12.571278).
- 1 Morales, A.E. , Dong, Y. , Brown, T., Baid, K., **Kontopoulos, D.-G.**, Gonzalez, V., Huang, Z., Ahmed, A.-W., Bhuinya, A., Hilgers, L., Winkler, S., Hughes, G., Li, X., Lu, P., Yang, Y., Kirilenko, B.M., Devanna, P., Lama, T.M., Nissan, Y., Pippel, M., Dávalos, L.M., Vernes, S.C., Puechmaille, S.J., Rossiter, S.J., Yossi, Y., Prescott, J.B., Kurth, A., Ray, D.A., Lim, B.K., Myers, E., Teeling, E.C., Banerjee, A., Irving, A.T. , & Hiller, M.  Reference-quality bat genomes illuminate adaptations to viral tolerance and disease resistance. Available from Research Square: [doi:10.21203/rs.3.rs-2557682/v1](https://doi.org/10.21203/rs.3.rs-2557682/v1).

### Preprints

- 1 **Kontopoulos, D.-G.** , Patmanidis, I., Barraclough, T.G., & Pawar, S. Changes in flexibility but not in compactness underlie the thermal adaptation of prokaryotic adenylate kinases. Available from bioRxiv: [doi:10.1101/2024.09.04.611173](https://doi.org/10.1101/2024.09.04.611173).

## Fellowships, scholarships, and awards

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|---|--|-----------------------|
| 4 | <b>EMBO</b> Postdoctoral Fellowship. €168,000  | Mar. 2022 - Apr. 2024 |
| 3 | Travel award from the <b>Department of Life Sciences, Imperial College London</b> for attending the 2017 Congress of the European Society for Evolutionary Biology in Groningen, the Netherlands. £500 | May 2017              |
| 2 | Science and Solutions for a Changing Planet Doctoral Training Partnership scholarship from the <b>Natural Environment Research Council</b> . £57,300   | Oct. 2015 - Apr. 2019 |
| 1 | Scholarship for 2013-2014 postgraduate education abroad (1st cycle) from the <b>Greek State Scholarships Foundation (IKY)</b> . €16,290  | Dec. 2013             |

## Presentations

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### Invited talks

- 4 **Evolution of ecophysiological responses to temperature changes.** Université Clermont Auvergne, France, 10th November 2023.
- 3 **Deep-time evolution of biological responses to temperature changes.** Ecology & Evolution Seminar Series, Imperial College London, Silwood Park Campus, United Kingdom, 10th October 2019.
- 2 **Deep-time evolution of physiological responses to temperature changes.** Stanford, CA, United States of America, 13th September 2019.
- 1 **Trait correlations vs environmental drivers in the evolution of phytoplankton thermal responses.** National Taiwan University, Taiwan, 26th March 2018.

### Contributed talks

- 7 **Kontopoulos, D.-G.**, Levesque, D.L., & Hiller, M. (2023) Physiological, ecological, and genomic underpinnings of daily torpor and hibernation across mammals and birds. *2023 Annual Meeting of the Ecological Society of America, Portland, OR, United States of America, 6th-11th August.*
- 6 **Kontopoulos, D.-G.**, van Sebille, E., Lange, M., Yvon-Durocher, G., Barraclough, T.G., & Pawar, S. (2018) Non-random adaptive evolution of the thermal sensitivity of growth rate among phytoplankton. *Gordon Research Seminar on Unifying Ecology Across Scales, Biddeford, ME, United States of America, 21st-22nd July.*
- 5 **Kontopoulos, D.-G.**, van Sebille, E., Lange, M., Yvon-Durocher, G., & Pawar, S. (2018) Trait correlations vs environmental drivers in the evolution of phytoplankton thermal responses. *65th Annual Meeting of the Ecological Society of Japan, Sapporo, Japan, 14th-18th March.*
- 4 **Kontopoulos, D.-G.**, Yvon-Durocher G., & Pawar, S. (2017) Niche convergence in the macroevolution of the thermal sensitivity of phytoplankton growth rate. *2017 Congress of the European Society for Evolutionary Biology, Groningen, the Netherlands, 20th-25th August.*
- 3 **Kontopoulos, D.-G.**, Yvon-Durocher, G., & Pawar, S. (2016) Deep-time macroevolution of thermal sensitivity of growth rate among phytoplankton. *Annual Meeting of the British Ecological Society, Liverpool, United Kingdom, 11th-14th December.*
- 2 **Kontopoulos, D.-G.**, Yvon-Durocher, G., Chen, B., Thomas, M. K. & Pawar S. (2014) Γενικά μοτίβα θερμικής προσαρμογής μεταξύ των ειδών του φυτοπλαγκτού [General patterns of thermal adaptation among phytoplankton]. *7th National Congress of the Hellenic Ecological Society, Mytilene, Greece, 9th-12th October.*
- 1 **Kontopoulos, D.-G.** & Glykos, N.M. (2012) Pinda: a web service for detection and analysis of intraspecies gene duplications. *7th Conference of the Hellenic Society for Computational Biology and Bioinformatics, Heraklion, Greece, 4th-6th October.*

### Contributed posters

- 3 **Kontopoulos, D.-G.**, Patmanidis, I., Barraclough, T.G., & Pawar, S. (2018) Nonsynonymous mutations are more detrimental at high temperatures; a prokaryote-wide study of adenylate kinases. *Gordon Research Conference on Unifying Ecology Across Scales, Biddeford, ME, United States of America, 22nd-27th July.*

- 2 Kontopoulos, D.-G.**, Yvon-Durocher, G., & Pawar, S. (2016) Deep-time macroevolution of thermal sensitivity of growth rate among phytoplankton. *Gordon Research Conference on Unifying Ecology Across Scales, Biddeford, ME, United States of America, 24th-29th July.*
- 1 Kontopoulos, D.-G.**, Yvon-Durocher, G., Allen, A.P., Chen, B., Thomas, M.K., & Pawar, S. (2014) Phylogenetic constraints and environmental drivers of thermal adaptation among the phytoplankton. *Annual London Evolutionary Research Network Conference, London, United Kingdom, 5th November.*

## Research skills

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### Thermal biology

- quantifying the shape of thermal performance curves for physiological, ecological, or other biological traits through diverse (80+) nonlinear mathematical models.
- identifying trait-trait and trait-environment associations through phylogenetic generalised linear mixed models with numerous (up to 22 so far) covarying response variables.

### Phylogenetics

- likelihood-based reconstruction of gene and species trees.
- timetree inference.

### Ecological modelling

- modelling predator-prey population dynamics using ordinary differential equations.
- agent-based modelling with NetLogo.

### Bioinformatics

- genome alignment and annotation.
- Gene Ontology term enrichment.
- genome-wide screening for signatures of selection or gene losses, associated with a trait of interest.
- analysis of sequence or physicochemical conservation.
- protein structure modelling and comparison.
- molecular dynamics simulations.

### Statistics and data science

- Bayesian statistics.
- phylogenetic comparative methods.
- likelihood-based model selection.
- dimensionality reduction and clustering.
- machine learning.

### Scientific programming

- extensive experience in Perl and R.
- good experience in Python and SQL.
- basic experience in Common Lisp, C, and Shell.
- version control using Git.
- some experience in web development.

## Teaching experience

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### As a course demonstrator

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| • <b>Further Topics in Statistics</b>  | <b>2015-18</b> |
| MSc/MRes “Ecology, Evolution and Conservation”, Imperial College London  |                |
| • <b>Intro to UNIX and Linux</b>   | <b>2017</b>    |
| MSc/MRes “Computational Methods in Ecology and Evolution” and “Quantitative and Modelling Skills in Ecology and Evolution” Centre for Doctoral Training, Imperial College London |                |
| • <b>Statistics</b>  | <b>2014-15</b> |
| BSc “Biological Sciences”, year 1, Imperial College London   |                |
| • <b>Biological Computing in Python II</b>   | <b>2014</b>    |
| MSc/MRes “Computational Methods in Ecology and Evolution”, Imperial College London   |                |

• <b>Computational Biostatistics</b>	<b>2014</b>
BSc “Biological Sciences”, year 2, Imperial College London	

#### As a course tutor

• <b>MSc/MRes “Computational Methods in Ecology and Evolution”</b> , Imperial College London	<b>2014-15</b>
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#### As a workshop presenter

• <b>“How to generate topological constraints using the Open Tree of Life”</b>	<b>30 March 2017</b>
Silwood Computer Skillz Workshop, Imperial College London	

### Student project supervision

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• <b>Georgios Kalogiannis</b> - MRes “Computational Methods in Ecology and Evolution”, Imperial College London. <b>Thesis:</b> “Gene loss is an important signature of insect size evolution” <b>Primary supervisor:</b> Samraat Pawar	<b>2024</b>
• <b>Aditi Madkaikar</b> - MRes “Computational Methods in Ecology and Evolution”, Imperial College London. <b>Thesis:</b> “Predicting the thermal niche of a ubiquitous bacterium using whole genome sequence” <b>Primary supervisor:</b> Samraat Pawar <b>Other supervisors:</b> Arianna Basile	<b>2023</b>
• <b>Kate Griffin</b> - MSc “Computational Methods in Ecology and Evolution”, Imperial College London. <b>Thesis:</b> “Can’t stand the heat? An analysis of the thermal sensitivity of arthropods, how it has evolved & factors influencing it” <b>Primary supervisor:</b> Samraat Pawar <b>Other supervisors:</b> Paul Huxley, Lauren Cator	<b>2022</b>

### Outreach / public engagement

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• Exhibitor at the <b>Great Exhibition Road Festival</b> , London, UK	<b>7th-8th May 2016</b>
• Co-organiser of the <b>“Drawing Climate Change” activity at the Science Museum Lates</b> , London, UK	<b>30th March 2016</b>

### Service

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Manuscript reviewer for *Ecology Letters*, *Frontiers in Microbiology*, *Functional Ecology*, *Journal of Plankton Research*, *Journal of Thermal Biology*, *Physiological and Biochemical Zoology*, *Scientific Reports*, and *Systematic Biology*.

### Scientific workshops and courses attended

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<b>4 An Introduction to Mechanistic Niche Modelling with NicheMapR and TrenchR</b> , 2023 Annual Meeting of the Ecological Society of America, Portland, OR, United States of America.	<b>6th August 2023</b>
<b>3 EMBO Laboratory Leadership course</b> , EMBO Solutions, Heidelberg, Germany.	<b>5th-7th July 2023</b>
<b>2 “Introduction to Agent-Based Modelling” Massive Open Online Course</b> , Santa Fe Institute, held online.	<b>June 2022 - August 2022</b>
<b>1 Evolutionary Quantitative Genetics workshop</b> , Friday Harbor Laboratories, Univer- sity of Washington, held online.	<b>11th-15th July 2022</b>

### Language skills

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Native proficiency in **Greek**, full proficiency in **English**, sufficient proficiency in **French**, basic proficiency in **German**.

## References

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**Prof. Samraat Pawar**

**Title:** Professor of Theoretical Ecology

**Affiliation:** Department of Life Sciences, Imperial College London, Silwood Park

**Email address:** s.pawar@imperial.ac.uk

**Prof. Michael Hiller**

**Title:** Professor of Comparative Genomics

**Affiliation:** LOEWE Centre for Translational Biodiversity Genomics, Senckenberg Research Institute, & Goethe University

**Email address:** michael.hiller@senckenberg.de

**Prof. Timothy G. Barraclough**

**Title:** Professor of Evolutionary Biology

**Affiliation:** Department of Biology, University of Oxford

**Email address:** tim.barraclough@biology.ox.ac.uk

## Additional information

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**Nationality:** Greek

**Member of Scientific Societies:** [Society for the Study of Evolution](#), [Ecological Society of America](#), [Panhellenic Association of Biologists](#).

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