Dimitrios - Georgios **Kontopoulos**

EMBO Postdoctoral Fellow

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I am a quantitative biologist. My research mainly focuses on understanding **how environmental changes affect biological systems (from molecules to ecosystems) over short or long timescales**. I approach this goal using a diverse set of approaches, including meta-analyses of empirical datasets, ecoinformatics, phylogenetic comparative methods, and comparative genomics.

Research appointments and internships

- **EMBO Postdoctoral Fellow at Prof. Michael Hiller's group**, LOEWE Centre for Translational Biodiversity Genomics, Senckenberg Research Institute, Frankfurt, Germany — **Mar. 2022 - Present**
- **Postdoctoral researcher at Prof. Michael Hiller's group**, LOEWE Centre for Translational Biodiversity Genomics, Senckenberg Research Institute, Frankfurt, Germany — **May 2021 - Feb. 2022**
- **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)

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. ✉ Variation in temperature of peak trait performance will constrain adaptation of arthropod populations to climatic warning. *Nature Ecology & Evolution. In press*. Preprint available from bioRxiv: doi:10.1101/2023.01.18.524448.

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 Sebille, 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.

Manuscripts under review

2 **Kontopoulos, D.-G.** ✉, Sentis, A., Daufresne, M., Dell, A.I., & Pawar, S. No model to rule them all: a systematic comparison of 83 thermal performance curve models across traits and taxonomic groups. Available from bioRxiv: doi:10.1101/2023.09.08.556856.

1 Morales, A.E.†, Dong, Y.†, Brown, T., Baid, K., **Kontopoulos, D.-G.**, Gonzalez, V., Huang, Z., Ahmed, A.-W., Hilgers, L., Winkler, S., Hughes, G., Li, X., 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.

Invited book chapters under review

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.

Manuscripts in preparation

1 **Kontopoulos, D.-G.**, Levesque, D.L., & Hiller, M. Numerous independent gains of torpor and hibernation across endotherms, linked with adaptation to diverse environments.

Fellowships, scholarships, and awards

4 **EMBO** Postdoctoral Fellowship. **Mar. 2022 - Apr. 2024**

3 Travel award from the **Department of Life Sciences, Imperial College London** for attending the 2017 Congress of the European Society for Evolutionary Biology in Groningen, the Netherlands. **May 2017**

2 Science and Solutions for a Changing Planet Doctoral Training Partnership scholarship from the **Natural Environment Research Council**. **Oct. 2015 - Apr. 2019**

1 Scholarship for 2013-2014 postgraduate education abroad (1st cycle) from the **Greek State Scholarships Foundation (IKY)**. **Dec. 2013**

Presentations

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

Comparative evolutionary analysis

Phylogeny reconstruction and timetree estimation, fitting various models of trait (co-)evolution, genome alignment, genome-wide screening for signatures of selection or gene losses, analysis of sequence conservation.

Thermal ecophysiology

Quantifying the shape of thermal performance curves of biological traits, identifying associations between traits and environmental variables.

Ecological modelling

Predator-prey population dynamics modelling, agent-based modelling.

Bioinformatics

Genome annotation, Gene Ontology term enrichment, protein structure modelling, molecular dynamics simulations.

Data science

Bayesian statistics, machine learning, dimensionality reduction, clustering.

Programming

Perl (extensive experience), R (extensive experience), LaTeX (very good experience), Python 2/3 (good experience), SQL (good experience), Common Lisp (basic experience), C (basic experience), and Shell (basic experience). Version control using Git, some experience in web development.

Operating Systems

Comfortable with any major Operating System, including GNU/Linux distributions (e.g., Debian, Gentoo), and macOS.

Teaching experience

As a course demonstrator

- **Further Topics in Statistics** **2015-18**
  MSc/MRes "Ecology, Evolution and Conservation", Imperial College London
- **Intro to UNIX and Linux** **2017**
  MSc/MRes "Computational Methods in Ecology and Evolution" and "Quantitative and Modelling Skills in Ecology and Evolution" Centre for Doctoral Training, Imperial College London
- **Statistics** **2014-15**
  BSc "Biological Sciences", year 1, Imperial College London
- **Biological Computing in Python II** **2014**
  MSc/MRes "Computational Methods in Ecology and Evolution", Imperial College London
- **Computational Biostatistics** **2014**
  BSc "Biological Sciences", year 2, Imperial College London

As a course tutor

- **MSc/MRes "Computational Methods in Ecology and Evolution"**, Imperial College London **2014-15**

As a workshop presenter

- **"How to generate topological constraints using the Open Tree of Life"** **30 March 2017**
  Silwood Computer Skillz Workshop, Imperial College London

Student project supervision

- **George Kalogiannis** - MRes "Computational Methods in Ecology and Evolution", Imperial College London. **2024**
  Thesis: TBD
  Primary supervisor: Samraat Pawar

- **Aditi Madkaikar** - MRes "Computational Methods in Ecology and Evolution", Imperial College London. **2023**
  Thesis: "Predicting the thermal niche of a ubiquitous bacterium using whole genome sequence"
  Primary supervisor: Samraat Pawar
  Other supervisors: Arianna Basile

- **Kate Griffin** - MSc "Computational Methods in Ecology and Evolution", Imperial College London. **2022**
  Thesis: "Can't stand the heat? An analysis of the thermal sensitivity of arthropods, how it has evolved & factors influencing it"
  Primary supervisor: Samraat Pawar
  Other supervisors: Paul Huxley, Lauren Cator

Outreach / public engagement

- Exhibitor at the **Great Exhibition Road Festival**, London, UK **7th-8th May 2016**
- Co-organiser of the **"Drawing Climate Change" activity at the Science Museum Lates**, London, UK **30th March 2016**

Service

Manuscript reviewer for ***Ecology Letters***, ***Functional Ecology***, ***Physiological and Biochemical Zoology***, ***Scientific Reports***, and ***Systematic Biology***.

Language skills

- Proficient knowledge in **English** (IELTS Academic band score of 8 (10th March 2012), Cambridge Proficiency, Michigan Proficiency, Pearson Test of English General Level 5).
- Proficient knowledge in **French** (Diplôme de Langue et Littérature Françaises 2ème degré Paris-Sorbonne C2, Certificat d'État hellénique de Connaissance des Langues niveau C1).
- Basic knowledge in **German** (Zertifikat Deutsch).

References

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

Nationality: Greek

Member of Scientific Societies: Society for the Study of Evolution, Ecological Society of America, Panhellenic Association of Bio-scientists.

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