

# Susy Echeverría-Londoño, PhD.

*NSF Postdoctoral Associate*

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## SUMMARY

I am an early career researcher focusing on the study of large-scale patterns of biodiversity, and the ecological and evolutionary processes that shaped them. I am also interested in understanding how human pressures have affected and will affect biodiversity in tropical regions. Throughout my career, I have gained extensive experience in the field of data science including data processing and visualisation, advanced statistical and spatial analysis. In my work, I particularly enjoy exploring and analysing biological data through visualisations tools.

## EMPLOYMENT

2018– **Visitor scholar**, *University of Pittsburgh, Department of Biological Sciences*, Pittsburgh, PA 15260, United States of America.

PI: Prof. Justin Kitzes

Exploring signals of past spatial patterns to predict extinction risk of plants using time-series spatial point patterns from Barro Colorado Island

2017– **NSF Postdoctoral Associate**, *Kenyon College, Department of Biology*, Gambier, OH 43022, United States of America.

PIs: Prof. Andrew Kerkhoff and Prof. Brian J. Enquist

- Researching the consequences of climatic stability, biome age and area effects on seed plant diversity.
- Carrying out paleoclimate reconstructions using machine learning methods such as random forest to calibrate biogeographic biome inferences.
- Co-teaching of the BSc course “Global Ecology and Biogeography” at Kenyon College.
- Taught and organized lectures and assignments for the Ecoinformatics skills course including Introduction to data science R, data managing and processing, data visualization, spatial analysis and reproducibility <https://globalecologybiogeography.github.io/Ecoinformatics/>

2017 **Lecturer and demonstrator**, *MSc Taxonomy and Biodiversity, Methods in Macroecology and Macroevolution course, Natural History Museum (NHM) and Imperial College London*, London, UK.

Phylogenetic approaches to studying diversification; Fossils in phylogenetics

2013–2016 **Demonstrator**, *Computational Biostatistics BSc course, Ecology and Evolution BSc course, Biodiversity and Conservation Biology BSc course, Imperial College London*, London, UK.

Introduction to R, Fundamentals of statistics in R, Phylogeny of mammals and pines, IUCN Red List, Biodiversity among lineages and over time, Delimiting species, Extinction risk patterns and correlates.

- 2011–2012 **Science teacher**, *New Cambridge School, Gimnasio pontevedra school, and La Quinta del puente school*, Bucaramanga, Colombia.
- 2008–2010 **Teaching Assistant and demonstrator**, *Systematics BSc course, Universidad Industrial de Santander; Bioinformatics MSc course, Universidad Industrial de Santander*, Bucaramanga, Colombia.

## EDUCATION

- 2013–2017 **PhD in Life Science**, *Imperial College London, Natural History Museum*, London, United Kingdom.

**Thesis:** Diversification patterns of *Solanum* L. (Solanaceae), plant macroecology and responses to land-use change.

Supervisor: Prof. Andy Purvis; Co-supervisor Dr Sandra Knapp

- Researched the dynamics of diversification of the megadiverse plant genus *Solanum* using a collation of geographical, genetic and taxonomic data along with phylogenetic comparative methods.
- Studied large-scale patterns of plant diversity and their responses to land-use change from data of a global collation of local field-based studies.
- Carried out large-scale evolutionary modelling exercise on a high-performance Linux cluster.

- 2012–2013 **MRes (Distinction), Biodiversity, Informatics and Genomics**, *Imperial College London*, Silwood Park, United Kingdom.

- 2004–2010 **BSc (1st class honours) in Biology**, *Universidad Industrial de Santander*, Bucaramanga, Colombia.

## COMPUTER SKILLS

OS	Linux/Unix, Windows, OS X
Programming	Proficient R, Basic Python, Basic C++, shell, basic HPC cluster scripts
Data Science	Data cleaning, processing and visualization, proficient GIS skills in R and ArcGIS, Advanced statistical analysis (e.g., Generalized Linear Mixed Models, Random Forests)
Version control	Git
Typography	L <sup>A</sup> T <sub>E</sub> X, OpenOffice/LibreOffice

## PUBLICATIONS

- In prep **Echeverría-Londoño S.**, Neves, DM. , Kerkhoff, AJ., Enquist, BJ. Evolutionary biome shifts of angiosperms in the New World.
- In prep Neves, DM. , Kerkhoff, AJ, **Echeverría-Londoño S.**, Enquist, BJ. The evolutionary history of New World biomes.
- In prep **Echeverría-Londoño S.**, De Palma, A., Contu, S., Hill, S. L., Lysenko, I., Knapp, S., and Purvis, A. Plant species' responses to land-use change: A global perspective.
- 2018 **Echeverría-Londoño S.**, Enquist, BJ, Neves, DM, Violle, C and Kerkhoff, AJ. Plant functional diversity and the biogeography of biomes in North and South America, *Frontiers in Ecology and Evolution*, 6(DEC), 219.
- 2018 **Echeverría-Londoño S.**, Särkinen, T., Fenton, I. S., Knapp, S., & Purvis, A. Dynamism and context dependency in the diversification of the megadiverse plant genus *Solanum* L.(Solanaceae). *bioRxiv*, 348961.

- 2017 Isaacs, P., **Echeverría-Londoño, S.**, Urbina, N and Purvis, A. Species Composition and Changes in Land Use: considerations under climatic change scenarios. Moreno, L. A., Andrade, G. I. and Ruíz-Contreras, L. F. (Ed.) In *Biodiversity 2016. Status and Trends of Colombian Continental Biodiversity*. Instituto de Investigación de Recursos Biológicos Alexander von Humboldt, 106 p.
- 2017 Hudson, L. N., Newbold, T., Contu, S., Hill, S. L., Lysenko, I., De Palma, A., Diaz, S., **Echeverría-Londoño S.**, ... & Purvis, A. The database of the PREDICTS (Projecting responses of ecological diversity in changing terrestrial systems) project. *Ecology and Evolution*, 7(1), 145-188.
- 2016 **Echeverría-Londoño S.**, Newbold, T., Hudson, L. N., Hill, S. L., Contu, S., Lysenko, I., ... & Purvis, A. Modelling and projecting the response of Colombian biodiversity to land-use change. *Diversity and Distributions*, 22: 1099-1111, doi:10.1111/ddi.12478.
- 2015 Newbold, T., Hudson, L. N., Hill, S. L., Contu, S., Lysenko, I., Senior, R. A., Bennet D. J., Choimes A., Collen, B., Day, J., De Palma, A., Diaz, S., **Echeverría-Londoño S** ... & Purvis, A. Global effects of land use on local terrestrial biodiversity. *Nature*, 520(7545), 45-50.
- 2014 Newbold, T., Hudson, L. N., Contu, S., Hill, S. L., Lysenko, I., De Palma, A., Phillips, H., Senior, R. A., Bennet D. J., Booth, H., Choimes A., Correia, D. L. P., Day, J, **Echeverría-Londoño S** ... & Purvis, A. The PREDICTS database: a global database of how local terrestrial biodiversity responds to human impacts. *Ecology and evolution* 4.24: 4701-4735.
- 2011 **Echeverría-Londoño, S.** & Miranda-Esquivel, D. R. MartiTracks: A geometrical approach for identifying geographical patterns of distribution. *PLoS ONE* 6(4): e18460. doi:10.1371/journal.pone.0018460 <http://dx.plos.org/10.1371/journal.pone.0018460>.
- 2010 Miranda-Esquivel, D. R, Morales-Guerrero, A. M & **Echeverría-Londoño S.** ¿Cuántos somos? y ¿Cómo nos cuantificamos?. Book chapter. *Evolución "Historia de la Vida"*. Asociación Colombiana para el avance de la Ciencia ACAC.

## INTERNATIONAL CONFERENCE PRESENTATIONS

- 2018 **Presentation:** Echeverría-Londoño S., et al. Explosive diversification of *Solanum* L (Solanaceae) in the old world. **Three Rivers Evolution meeting**, Pittsburgh, Pennsylvania, USA
- 2018 **Poster:** Echeverría-Londoño S., et al. Plant functional diversity and the biogeography of biomes in North and South America. **Three Rivers Evolution meeting**, Pittsburgh, Pennsylvania, USA
- 2018 **Poster:** Echeverría-Londoño S., et al. Plant functional diversity and the biogeography of biomes in North and South America. **Botany 2018**, Rochester, Minnesota, USA
- 2016 **VVIP Presentation:** Echeverría-Londoño S., et al. Modelling and projecting the response of Colombian biodiversity to land-use change. **State visit by the President of Colombia, Juan Manuel Santos, to the UK and the Prince of Wales**. Natural History Museum, London, United Kingdom
- 2016 **Presentation:** Echeverría-Londoño S., et al. Modelling and projecting the response of Colombian biodiversity to land-use change. **First symposium of Colombian research in the UK**. Imperial College London, London, United Kingdom
- 2016 **Presentation:** Echeverría-Londoño S., Knapp S. & Purvis A. Explosive diversification of *Solanum* L (Solanaceae) in the old world. **BES macroecology meeting 2016**. Oxford University, Oxford, United Kingdom
- 2016 **Presentation:** Echeverría-Londoño S., Knapp S. & Purvis A. Diversification patterns of genus *Solanum*. **NHM students conference 2016**. Natural History Museum, London, United Kingdom
- 2015 **Poster:** Echeverría-Londoño S., Knapp S. & Purvis A. Explosive diversification of *Solanum* L (Solanaceae) in the old world. **Systematics: The Science that Underpins Biology. The Systematic Association Biennial meeting**, Oxford University, Oxford, United Kingdom

- 2015 **Presentation:** Echeverría-Londoño S., Knapp S. & Purvis A. Explosive diversification of *Solanum* L (Solanaceae) in the old world. **EU Macroecology meeting.** Zoological museum of Copenhagen, Copenhagen, Denmark
- 2015 **Poster:** Echeverría-Londoño S., Knapp S & Purvis A. Diversification patterns of *Solanum*. **NHM students conference 2015.** Natural History Museum, London, United Kingdom
- 2014 **Poster:** Echeverría-Londoño S., Knapp S & Purvis A. Diversification patterns of *Solanum*. **The London Evolutionary Research Network (LERN).** Queen Mary University, London, United Kingdom
- 2014 **Poster:** Echeverría-Londoño S., Knapp S & Purvis A. Patterns of lineage diversification in the genus *Solanum* L. **Plants Radiation meeting.** Institute of Systematic Botany, University of Zürich, Switzerland
- 2013 **Presentation:** Echeverría-Londoño S., *et al.*, Modelling and projecting the responses of Colombian biodiversity to human impacts. **11th INTECOL Conference, Ecology,** London, United Kingdom
- 2010 **Presentation:** Echeverría-Londoño S & Miranda-Esquivel D. M. Panbiogeografía cuantitativa: un acercamiento geométrico. **III Congreso Colombiano de Zoología.** Medellín, Colombia
- 2009 **Presentation:** Miranda-Esquivel D. M, Echeverría-Londoño S. & Morales-Guerrero A. M. Todas las secuencias son iguales, pero unas son mas iguales que otras. **III Simposio red colombiana de Biología Evolutiva.-Colevol-** Cali, Colombia

## INVITED SEMINARS

- 2018 Ecology and Evolution seminars, Department of Biological Sciences, University of Pittsburgh, USA.
- 2017 Department of Biology seminars, Kenyon College, USA.
- 2017 Ecosystems and Tropical Forest group lab seminar, School of Geography and the Environment, University of Oxford, UK.
- 2015 Ecology and Evolution seminar, Royal Botanic Garden Edinburgh, UK.

## AWARDS AND RECOGNITIONS

- 2018 NSF grant fund “RCN-UBE Incubator: The Biological and Environmental Data Education Network”, \$ 72,361
- 2016 Selected to present research to the (Nobel Peace Prize winning) President of Colombia and His Royal Highness the Prince of Wales. Natural History Museum, London, UK
- 2013 Distinction in MRes in Biodiversity Informatics and Genomics. Imperial College London. Silwood Park Campus, UK
- 2004–2009 Academic Stimuli. First place (Highest GPA) in I, II, IV, IX semester. Academic program of Biology. Universidad Industrial de Santander, Bucaramanga, Colombia

## RESEARCH SCHOLARSHIPS

- 2012-2016 Postgraduate scholarship. Administrative Department of Science, Technology and Innovation of Colombia (Colciencias). £122,000
- 2013 Training and travel grant. British Ecology Society (BES): £300
- 2013 Bursary. MRes in Biodiversity Informatics and Genomics. Imperial College London. Silwood Park Campus: £1,000

## ROLES AND RESPONSIBILITY

- 2014 *Science Uncovered at the Natural History Museum.* Presented the PREDICTS project ([www.predicts.org.uk/](http://www.predicts.org.uk/)): Projecting Responses of Ecological Diversity In Changing Terrestrial Systems, and also the Solanaceae source project [www.solanaceaesource.org](http://www.solanaceaesource.org)

2015–2016 Secretary. Latin American Society, Imperial College London, London, UK. Responsible for running the fresher-fair, writing minutes and organizing dance sessions.

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## LANGUAGES

Spanish Native  
English Proficient  
Italian Intermediate

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## References

### **Prof Andrew J. Kerkhoff**

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### **Dr Sandra Knapp**

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