

# Pablo Catalán Fernández

PhD student  
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## Career summary

I am doing my PhD in theoretical evolutionary biology under the supervision of Professor José A. Cuesta. We are interested in understanding the complexities of the genotype-phenotype map and their consequences on the dynamics of the evolutionary process. To this end, we have developed `toyLIFE`, a computational model that integrates molecular, regulatory and metabolic processes, and that will allow us to study the construction and evolution of complex phenotypes.

## Education

**Sep 2013—present:** BSc in Mathematics (4-year degree, currently studying 4<sup>th</sup> year)  
Universidad Española de Educación a Distancia (UNED)

**Sep 2011—Oct 2012:** MSc in Modelling and Physics of Complex Systems  
Universidad Rey Juan Carlos I de Madrid (URJC)  
GPA: 3.45 || *Thesis:* Mutation-selection equilibrium in finite populations playing a Hawk-Dove game

**Sep 2006—Jun 2011:** BSc+MSc in Biology (5-year degree)  
Universidad Complutense de Madrid (UCM)  
GPA: 3.66 (Graduated with honors)

## Additional formation

**Sept 2013** Third Summer School on Physics of Complex and Small Systems  
Organized by GEFENOL and IFISC

## Awards

**Mar 2016** MINECO Short-Term Fellowship: 60 days visit to Robert Beardmore's lab, University of Exeter.

**Mar 2015** EMBO Short-Term Fellowship: 90 days visit to Andreas Wagner's lab, University of Zurich.

## Professional Experience

**Dec 2012—present:** Predoctoral fellow (FPI fellowship)  
Department of Mathematics, Universidad Carlos III de Madrid (UC3M)  
Research topic: Models in molecular evolution  
**Supervisor:** Prof. José A. Cuesta

**Oct 2010—Jun 2011:** Assistant scholar  
Department of Ecology, Universidad Complutense de Madrid (UCM)  
Research topic: Reproductive allocation strategies in *Cistus ladanifer*  
**Supervisor:** Dr. Juan Antonio Delgado

**Jun 2010—Sep 2010:** Research assistant

Department of Ecosystem Biogeochemistry, Institute of Natural Resources (CSIC)

Research topic: Biogeochemistry in lakes

**Supervisor:** Prof. Salvador Sánchez-Carrillo

**Dec 2008—Jun 2010:** Excellency scholar

Department of Ecology, Universidad Complutense de Madrid (UCM)

Research topic: Reproductive allocation strategies in *Cistus ladanifer*

**Supervisor:** Dr. Juan Antonio Delgado

## Languages

**English:** Full professional proficiency (C2).

**French:** Elementary proficiency (A2).

## Publications

7. CATALÁN, P., Arias, C.F., Cuesta, J. A. and Manrubia, S. **2017** Adaptive multiscales: an up-to-date metaphor to visualize molecular adaptation. *Biology Direct* **12:7**.
6. CATALÁN, P., Delgado, J.A., Jiménez, M.D. and Balaguer, L. **2016**. Sink strength manipulation in branches of a Mediterranean woody plant suggests sink-driven allocation of biomass in fruits but not of nutrients in seeds. *Acta Physiologiae Plantarum* **38:193**.
5. Planchuelo, G., CATALÁN, P. and Delgado, J.A. **2016**. Gone with the wind and the stream: Dispersal in the invasive species *Ailanthus altissima*. *Acta Oecologica* **73:31-37**.
4. Planchuelo, G., CATALÁN, P., Delgado, J.A. and Murciano A. **2016**. Estimating wind dispersal potential in *Ailanthus altissima*: The need to consider the three-dimensional structure of samaras. *Plant Biosystems*, DOI: 10.1080/11263504.2016.1174170.
3. CATALÁN, P., Seoane, J.M. and Sanjuán, M.A.F. **2015**. Mutation-selection equilibrium in finite populations playing a Hawk-Dove game. *Communications in Nonlinear Science and Numerical Simulations* **25:66-73**.
2. Arias, C.F., CATALÁN, P., Manrubia, S.M. and Cuesta, J.A. **2014**.  $\tau_{\text{OY}}$ LIFE: a computational framework to study the multi-level organization of the genotype-phenotype map. *Scientific Reports* **4: 7549**.
1. CATALÁN, P., Vázquez de Aldana, B.R., De las Heras, P., Fernández-Seral, A. and Pérez-Corona, M.E. **2013**. Comparing the allelopathic potential of exotic and native plant species on understory plants: are exotic plants better armed? *Anales de Biología* **35: 65-74**.

## Conference contributions

### Posters

4. CATALÁN, P., Fernández-Arias, C. and Cuesta, J. A. **2014**.  $\tau_{\text{OY}}$ LIFE: un universo de juguete para comprender mejor la evolución. **XIX Congreso de Física Estadística (FISES '14). April 2-4th 2014, Ourense (Spain)**.
3. CATALÁN, P., Jiménez, M.D., Delgado, J.A. and Balaguer, L. **2011**. Variation in sink strength affects size-mediated competition within the crown. **12 th EEF Congress. September 25-29th 2011, Ávila (Spain)**.

2. Pérez-Corona, M.E., CATALÁN, P., Fernández-Seral, A., De las Heras, P., Castro-Díez, P. and Vázquez de Aldana, B.R. **2011**. Effect of riverine invasive species in germination and radicle growth of understory species. **12 th EEF Congress. September 25-29th 2011, Ávila (Spain)**.
1. Pérez-Borrero, B., CATALÁN, P., Aguilar, E.Y., Fontecha, G., Trabanino, R., Gallego, F.J., Figueiras, A.M. and Benito, C. **2010**. Identificación con diferentes marcadores moleculares de cepas de *Beauveria bassiana* utilizadas en la lucha biológica contra la broca del café (*Hypothenemus hampei*). **XII Congreso Internacional de manejo integrado de plagas / XX reunión anual de la Sociedad americana de fitopatología (APS-CD). August 24-27th 2010, Managua (Nicaragua)**.

## Talks

4. CATALÁN, P. **2016**.  $t_{OY}$ LIFE, or the importance of being promiscuous. **International Workshop on Genotype-Phenotype Maps 2016 (IWGP 2016). 8-9 September 2016, Cambridge (UK)** (invited talk).
3. CATALÁN, P. **2015**.  $t_{OY}$ LIFE: the complexities of the genotype-phenotype map. **Modelling Biological Evolution 2015 (MBE '15), April 28-May 1 2015, Leicester (UK)** (invited talk).
2. CATALÁN, P. **2014**.  $t_{OY}$ LIFE: a toy Universe for gaining insight into biological evolution. **XI GISC Workshop, February 7th 2014, Madrid (Spain)**.
1. CATALÁN, P., Fernández-Arias, C. and Cuesta, J. A. **2013**.  $t_{OY}$ LIFE: a toy Universe for gaining insight into evolution. **4th SESBE Meeting. November 27-29th 2013, Barcelona (Spain)**.