



## Physical Ecology and Integrative Physiology

### SYLVAIN PINCEBOURDE

Born on December 22<sup>nd</sup>, 1977. French citizenship

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#### CURRENT POSITION

**2008** **Postdoctoral researcher** – PHYSICAL ECOLOGY OF PREY PREDATOR RELATIONSHIPS: IMPACT OF FLOW DYNAMICS IN THE LITTER BOUNDARY LAYER.

*Laboratory* Research Institute on Insect Biology (IRBI), Tours, France. Funded through the European Project CILIA.

*Advisor* Prof. Jérôme Casas ([jerome.casas@univ-tours.fr](mailto:jerome.casas@univ-tours.fr)).

#### UNIVERSITY EDUCATION

**2006-2007** **Postdoctoral researcher** – FORECASTING THE IMPACTS OF CLIMATE CHANGES ON INTERTIDAL BIOTIC INTERACTIONS.

*Laboratory* University of South Carolina, Department of Biological Sciences, Columbia, SC, USA. Co-funded by NASA and Lavoisier fellowship.

*Advisor* Ass. Prof. Brian Helmuth ([helmuth@biol.sc.edu](mailto:helmuth@biol.sc.edu)).

**2002-2005** **PhD thesis** – ENVIRONMENTAL BIOPHYSICS OF ENDOPHYTIC INSECTS. Obtained with honours (with congratulation from the jury).

*Laboratory* Research Institute on Insect Biology (IRBI), Tours, France.

*Advisor* Prof. Jérôme Casas ([jerome.casas@univ-tours.fr](mailto:jerome.casas@univ-tours.fr)).

**2001-2002** **MSc degree** – BIOLOGY, EVOLUTION AND CONTROL OF POPULATIONS. Obtained with honours.

*Laboratories* University François Rabelais (Tours, France) & National Museum of Natural History (Brunoy, France).

*Advisors* Dr. Marc Théry ([they@mnhn.fr](mailto:they@mnhn.fr)) & Dr. François Feer ([feer@mnhn.fr](mailto:feer@mnhn.fr)).

**1997-2001** **BSc degrees** – ORGANISMAL, POPULATION AND ECOSYSTEM BIOLOGY. Obtained with honours.

Universities of Cergy-Pontoise and Poitiers, France.

TRAINING COURSES

*SUMMER SCHOOLS*

**Atmospheric Boundary Layer Flows in Air Pollution Modelling** – von Karman Institute for Fluid Dynamics, Belgium (2008).

Some speakers: S.S. Zilitinkevich, A. Petrosyan, B. Sawford, R. Bornstein, P.J.H. Builtjes, M. Schatzmann, J.P. Boris.

**Physico-Chemical Ecology of Organisms** – Roscoff, France (2005).

Some speakers: F. Barth, S. Gorb, Y. Le Maho, J. Tautz, J.A.C. Humphrey, M.A.R. Koehl, C. Loudon, M.W. Denny, T. Blackledge.

**Biodiversity and Species Interactions** – Neuchâtel, Switzerland (2003).

Some speakers: J. Bascompte, C. Godfray, S. Hubbell, M. Loreau, D. Tilman.

**The Ecology of Light and Color** – Roscoff, France (2002).

Some speakers: J. Bradbury, A. Bennett, S. Johnsen, M. Cummings, S. Berthier, D. Stavenga, G. Parker, M. Théry, J. Casas.

*EUROPEAN PHD SCHOOL ON INSECT BIOTECHNOLOGY*

**Transgenic Plants for Insect Control** – Potenza, Italy (2005).

Speakers: A. Gatehouse, T. Shelton, C. Ritson, A. Cockburn, S. Arpaia.

**Insect Signalling and Interactions** – Maratea, Italy (2004).

Speakers: K. Hoffmann, C. Godfray, J. Pickett, M. Mackauer.

**Insect Plant Interactions** – Capri, Italy (2004).

Speakers: F. Wäckers, L. Vet, J. Casas, J. Hardie, J. Gatehouse, W. Boland.

**Insect Functional Morphology** – Siena, Italy (2003).

Speakers: R. Daillai, F. Bin, R. Romani, N. Isidoro.

**Insect Immunity** – Varese, Italy (2003).

Speakers: M. R. Strand, M. Brehélin, A. Nappi, F. Pennachio.

*ADDITIONAL COURSES*

**Electron Microscopy** – University François Rabelais, France (2004).

**Modelling and Simulation** – University François Rabelais, France (2004).

#### SCIENTIFIC COLLABORATIONS

**Applied Ecology** – Biogeography and thermal environment of a tropical insect pest. 2008-present.

Collaborator: Olivier Dangles, Pontificia Universidad Catolica de Ecuador, Quito, Ecuador.

**Thermal Ecology** – Impact of temperature on a keystone intertidal predator. 2006-present.

Collaborator: Eric Sanford, Bodega Marine Laboratory, University of California Davis, USA, and Brian Helmuth, University of South Carolina, USA.

**Plant Architecture** – Interaction between climate and canopy geometry in setting the thermal environment of a leaf mining insect. 2003-present.

Collaborators: Didier Combes and David Biron, PIAF INRA Clermont-Ferrand, France. [Initiated with Hervé Sinoquet].

**Nutritional Ecology 1** – Lifetime nutrient and energy dynamics of a parasitoid. 2002-2005.

Collaborators: Jérôme Casas and David Giron, Research Institute on Insect Biology, Tours, France.

**Nutritional Ecology 2** – New approaches in nutritional ecology of insect-plant interactions. 2004.

Collaborators: Joop J.A. van Loon, Laboratory of Entomology, Wageningen University, Netherland, and Jérôme Casas.

**Plant Eco-Physiology** – Stomatal responses to herbivorous insects. 2003-2004.

Collaborators: Ela Frak, PIAF INRA Clermont-Ferrand, France.

#### TEACHING ACTIVITIES

**Teaching activity** – University François Rabelais, 2003-2004.

Statistics and data processing for biologists (25hrs).

Animal and Plant ecology (70hrs).

**Supervision of students** – Research Institute on Insect Biology.

2003 – Sophie Delaide, BSc degree project.

2008 – Antoine Morisot, BSc degree project.

#### OTHER ACTIVITIES

**Referee for:**

Ecological Monographs;  
Journal of Animal Ecology;  
Global Change Biology;  
European Journal of Entomology;  
Journal of Applied Entomology;  
Plant Ecology;  
Annals of Applied Biology;  
National Science Foundation (NSF).

**Member of Societies:**

Ecological Society of America (ESA);  
British Ecological Society (BES);  
Society for Experimental Biology (SEB);  
Western Society of Naturalists (WSN).

## COMPETENCES AND SKILLS

### Modelling abilities

- ✓ Modelling plant and animal thermal budgets
- ✓ Modelling nutrient and energy budgets of animals
- ✓ Modelling CO<sub>2</sub> diffusion within leaves
- ✓ Modelling 3D geometry of plant canopies
- ✓ Modelling animal visual systems
- ✓ Modelling developmental rate of insects

### Specific equipments

- ✓ Microclimatic measurements, building biomimetic data loggers
- ✓ Thermal infrared camera
- ✓ Infrared gas exchange analyzer (LiCor 6400)
- ✓ Electromagnetic digitizer (canopy geometry)
- ✓ Spectrometry: measure of coloration and optical properties
- ✓ Laser Doppler anemometry (LDA)

**Computing/software specific skills:** MatLab and Systat.

**Additional skills:** Behavioural analysis, field sampling, macro photography, horticulture (orchids).

## AWARDS AND GRANTS

**Award** Journal of Animal Ecology youth author award 2007: Elton Prize for the best paper published in 2007 in Journal of Animal Ecology.

**Grant** Lavoisier Fellowship 2006-2007, French Ministry of Foreign Affairs. This grant partially covered my postdoc at the University of South Carolina.

## REFEREES

**Prof. Jérôme Casas** ✉ [casas@univ-tours.fr](mailto:casas@univ-tours.fr) ☎ +33 2 47-36-69-78  
Institut de Recherche sur la Biologie de l’Insecte, Université François Rabelais, Parc Grandmont, 37200 Tours, France.

**Ass. Prof. Brian Helmuth** ✉ [helmuth@biol.sc.edu](mailto:helmuth@biol.sc.edu) ☎ +001 803 777-2100  
Department of Biological Sciences, University of South Carolina, Sumter Street, Columbia SC 29208, USA.

**Ass. Prof. Eric Sanford** ✉ [edsanford@ucdavis.edu](mailto:edsanford@ucdavis.edu) ☎ +001 707 875-2040  
Department of Evolution and Ecology, University of California Davis, Bodega Marine Laboratory, PO Box 247, Bodega Bay CA 94923, USA.

**Dr. Marc Théry** ✉ [thery@mnhn.fr](mailto:thery@mnhn.fr) ☎ +33 1 60-47-92-29  
Muséum National d’Histoire Naturelle, Département d’Ecologie et de Gestion de la Biodiversité, 4 avenue du petit château 91800 Brunoy, France.

PUBLICATIONS (WITH IMPACT FACTOR 2007)

1. Sinoquet H., Pincebourde S., Adam A., Donès N., Phattaralerphong J., Combes D., Ploquin S., Sangsing K., Kasemsap P., Thanisawanyangkura S., Groussier G., Casas J. Leaf-scale 3D maps of tree canopy geometries. **Ecology** (Data paper), accepted. **IF 4.8**
2. Pincebourde S., Sanford E. & Helmuth B. (2008). Body temperature during low tide alters the feeding performance of a top intertidal predator. **Limnology & Oceanography** 53: 1562-1573. **IF 3.3**
3. Théry M., Pincebourde S. & Feer F. (2008). Dusk light environment optimizes visual perception of conspecifics in a crepuscular horned beetle. **Behavioral Ecology** 19, 627-634. **IF 3.0**
4. Pincebourde S., Sinoquet H., Combes D. & Casas J. (2007). Regional climate modulates the canopy mosaic of favourable and risky microclimate for insects. **Journal of Animal Ecology** 76, 424-438. *This paper received the **Elton Prize** from the British Ecological Society.* **IF 3.7**
5. Pincebourde S. & Casas J. (2006). Multitrophic biophysical budgets: Thermal ecology of an intimate herbivore insect plant interaction. **Ecological Monographs** 76, 175-194. **IF 8.1**
6. Pincebourde S., Frak E., Sinoquet H., Regnard J.L. & Casas J. (2006). Herbivory mitigation through increased water use efficiency in a leaf mining moth-apple tree relationship. **Plant Cell and Environment** 29, 2238-2247. **IF 4.5**
7. Pincebourde S. & Casas J. (2006). Leaf miner-induced changes in leaf transmittance cause variations in insect respiration rates. **Journal of Insect Physiology** 52, 194-201. **IF 2.3**
8. Casas J., Pincebourde S., Mandon N., Vannier F., Poujol R. & Giron D. (2005). Lifetime nutrient dynamics reveal simultaneous capital and income breeding in a parasitoid. **Ecology** 86, 545-554. **IF 4.8**
9. Loon J.J.A.v., Casas J. & Pincebourde S. (2005). Nutritional ecology of insect-plant interactions: persistent handicaps and the need for innovative approaches. **Oikos** 108, 194-201. **IF 3.1**
10. Feer F. & Pincebourde S. (2005). Diel flight activity and ecological segregation within an assemblage of tropical forest dung and carrion beetles. **Journal of Tropical Ecology** 21, 1-10. **IF 1.4**
11. Giron D., Pincebourde S. & Casas J. (2004). Lifetime gains of host-feeding in a synovigenic parasitic wasp. **Physiological Entomology** 29, 436-442. **IF 1.4**

**Manuscripts in preparation:**

Pincebourde S., Sanford E. & Helmuth B. Living on the edge of two changing worlds and having a backup: thermal ecology of an intertidal starfish.

Pincebourde S., Sanford E. & Helmuth B. What does “Environmental stress” mean? Specificity, ecologically relevant causes and unanticipated consequences.

Morice S., Pincebourde S., Darboux F. & Casas J. Spatial structure of leaf litter elevation at small scale: potential for driving species interaction strength?

SEMINARS AND WORKSHOPS

**Oral communications:**

1. Annual Meeting of the British Ecological Society (2-5/09 2008, London, Imperial College, **UK**).  
*Ecological impacts of climate changes: biophysics reveals the mechanisms*
2. Annual Meeting of the Society for Experimental Biology (6-10/07 2008, Marseilles, **France**).  
*Interaction between underwater and aerial body temperatures in influencing a top predator feeding rate in the intertidal*
3. Western Society of Naturalists – Annual meeting (6-9/11 2007, Ventura CA, **USA**)  
*Environmental variations and keystone predator performance in the intertidal*
4. Invited speaker – Center for Insect Sciences, University of Arizona (November 1 2007, Tucson AZ, **USA**)  
*Environmental biophysics of a leaf mining insect*
5. Western Society of Naturalists – Annual meeting (9-12 November 2006, Redmond WA, **USA**)  
*Thermal stress alters feeding rate in a keystone predator*
6. John and Mary Louise Seminar Series UC Davis (26 July 2006, Bodega Marine Lab, **USA**)  
*Thermal ecology of an intimate herbivore insect – plant relationship*
7. Entomologentagung in Dresden (March 21-24, 2005, Dresden, **Germany**)  
*Making the best of mother's choice: use of the mine microhabitat by a leaf miner*
8. VIIeme Journées d'Ecologie Fonctionnelle (March 8-10, 2005, Super-Besse, **France**)  
*Ecologie thermique d'une relation intime entre un insecte herbivore et sa plante hôte*
9. European PhD Course in Insect Biotechnology: Insect Signalling and Interactions (October 17-20, 2004, Maratea, **Italy**)  
*The thermal environment of a phyto-endophagous insect*
10. SIP 12 – Symposium Insect-Plant Relationships (August 7-12, 2004, Berlin, **Germany**)  
*Take over of stomatal control by a leaf mining insect*
11. European PhD Course in Insect Biotechnology: Insect-Plant Interactions (May 16-19, 2004, Capri, **Italy**)  
*Take over of stomatal control by a leaf mining insect*
12. ACI Ecologie Quantitative (December 15, 2003, Tours, **France**)  
*Le microclimat d'un insect vivant à l'intérieur d'un vegetal*
13. Forum NATRIX-association for naturalists- (December 5, 2003, Tours, **France**)  
*Evolutionary Biology of temperate orchids: hybridisation matters*
14. Association for Tropical Biology and Conservation, and the British Ecological Society: Biotic Interactions in the Tropics (July 7-10, 2003, Aberdeen, **UK**)  
*Physical ecology of ambient light constraints colour signalling in birds and horned beetles*
15. Colloque de la Société Française d'Etude du Comportement Animal (April 6-8, 2003, Tours, **France**)  
*Coloration corporelle et signalisation visuelle honnête chez un scarabée à corne de Guyane Française*
16. GDR Ecologie Comportementale (September 8-10, 2002, Dijon, **France**)  
*Sélection de l'habitat lumineux chez des bousiers Phanaeini (Coleoptera, Scarabaeidae) de forêt primaire en Guyane française*

**Posters:**

17. 11<sup>th</sup> International Behavioral Ecology Congress (23-29 July 2006, Tours, **France**)  
*Colour signalling to conspecifics in a horned beetle*
18. Jacques-Monod seminars (CNRS) on the Physico-Chemical Ecology of organisms (September 24-28, 2005, Roscoff, **France**)  
*Multitrophic biophysical budgets: Thermal ecology of an intimate herbivore insect-plant interaction*
19. Annual Meeting of the Society for Experimental Biology (July 11-15, 2005, Barcelona, **Spain**)  
*Multitrophic biophysical budgets: Thermal ecology of an intimate herbivore insect-plant interaction*
20. Summer School on Biodiversity and Species Interactions (October 15-18, 2003, Neuchâtel, **Switzerland**)  
*Thermal regime, canopy geometry and prey-predator interactions*