

## Alexa Sadier, PhD

**Karen Sears lab - 4117**  
UCLA Department of Ecology and Evolutionary Biology  
621 Charles E. Young Drive South  
Los Angeles, CA 90095-7246

**Phone:** +1-312-813-9264  
**email:** [asadier@ucla.edu](mailto:asadier@ucla.edu)  
**Website:** [www.alexasadier.com](http://www.alexasadier.com)  
**ORCID :** 0000-0002-9907-37

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### KEY WORDS

**Eco-evo-devo, teeth, development, bats, GRNs, developmental bias, constraints**

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### CURRENT POSITION

**2017-present** **Postdoctoral research associate – Associate scientist**  
Developmental rules behind teeth development in bats  
Evo-Devo of sensory adaptations in Noctilionoid bats  
University of California, Los Angeles  
Advisor: Karen Sears

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### EDUCATION AND RESEARCH POSITIONS

**2015-2017** **Postdoctoral research associate**  
Evo-devo of sensory adaptation in Noctilionoid bats  
University of Illinois at Urbana-Champaign, Illinois, Advisor: Pr. Karen Sears

**2014** **Postdoctoral scholar short-term**  
Ecole Normale Supérieure de Lyon, IGFL, Postdoctoral research position, 4 months

**2009-2013** **PhD in Evolutionary and Developmental Biology – Molecular Zoology group**  
Ecole Normale Supérieure de Lyon, IGFL, France  
Thesis: “Evo-devo of the Eda pathway, from the evolution of signaling to the establishment of shape”. Advisors: Pr. Vincent Laudet and Dr. Sophie Pantalacci  
**Highest honors and felicitations** from the committee

**2007-2008** **Master 2 “high school and higher education”/Préparation à l’agrégation**  
Ecole Normale Supérieure de Lyon, France, highest educational degree for highschool and undergrad education in Biology and Geology. Major: A, Molecular Biology  
Agrégation: admissible; CAPES: admitted, position offered, **national ranking 4/3393**

**2008-2009** **Master “research” Biosciences**  
**2006-2007** Ecole normale supérieure de Lyon, IGFL Master 1 and 2 - **With honors**  
Theses: “Alternative isoforms of the *Edaradd* gene in evolution” and “The cryptic species diversity of the genus *Proasellus*”. Advisors: Sophie Pantalacci and Vincent Laudet (2008-2009) and Christophe Douady (2006-2007)

**2005-2006** **Licence in Molecular and Cellular Biology**  
Ecole normale supérieure de Lyon, France – EU equivalent of Bachelor, 2 months lab experience – published research (see MBE 2008)  
Supervisor: Sophie Pantalacci

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### AWARDS AND GRANTS

**2021** **UCLA Chancellor’s award for postdoctoral research – awardee**  
The Chancellor’s Award for Postdoctoral Research recognizes the 10 most important contributions (among the ~1400 postdocs from all disciplines) that postdoctoral scholars make to UCLA’s research mission – **7500\$** <https://www.postdoc.ucla.edu/chancellors-award-for-postdoctoral-research/>

- 2020 NSF IOS grant - Leader investigator of the project - Collaborators: PIs Karen Sears (UCLA), Sharlene Santana (UW) and Paul François (Mc Gill)**  
Starting July 2020 – 600 k\$
- 2020 iBiology Young Scientists Seminar Award – winner**
- 2017 MBI workshop travel grant – 600\$**
- 2012 Grant ARC (Research against Cancer Association) Foundation**  
Awarded a project on the role of EDAR in cancer – One year of full support ~20k €
- 2009 Teaching fellowship – “monitorat”**  
Extra salary for teaching activities including: TA, full lectures and full courses teaching and conception – 80h/year ~ 7.75k €/year
- 2009 MRT PhD fellowship**  
Supporting 3 years of salary for research - Ranked 3/50 (15/50 were awarded) ~12.25k €/year

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## PUBLICATIONS

\*: equal contributions

### Research articles in preparation, submitted or accepted:

**Sadier Alexa**, Andrew Krause, Dessalles Renaud, Nieves Natalie, Santana Sharlene and Karen Sears Finding new rules for the patterning of post-canine teeth in mammals *research article in prep*

Gregory L. Mutumi, Ronald P. Hall, Brandon P. Hedrick, Laurel R. Yohe, **Alexa Sadier**, Kalina T.J. Davies, Liliana M. Dávalos, Stephen J. Rossiter, Karen E. Sears and Elizabeth R. Dumont Disentangling biomechanical and sensory modules in a hyper-diverse radiation *in review* **The Am Naturalist**

Neal Anthwal\*, Daniel Urban\*, **Alexa Sadier**, Risa Takenaka, Simon Spiro, Nancy Simmons, Karen Sears Control of Morphological Variation and Molecular Initiation of Novel Chiropteran Wing Membranes are Revealed by Embryonic Developmental Processes *in revision* **Current Biology**

Ronald P. Hall, Gregory L. Mutumi, Brandon P. Hedrick, Laurel R. Yohe, Alexa Sadier, Kalina T.J. Davies, Stephen J. Rossiter, Karen Sears, Liliana M. Dávalos, and Elizabeth R. Dumont Evolution of Diet and Sensory Structures in an Adaptive Radiation *accepted* **Evolution**

### Published:

#### Research articles:

**2021**

Nojiri T, Wilson LAB, López-Aguirre C, Tu VT, Kuratani S, Ito K, Higashiyama H, Son NT, Fukui D, **Sadier A**, Sears KE, Endo H, Kamihori S, Koyabu D. 2021. Embryonic evidence uncovers convergent origins of laryngeal echolocation in bats. **Current Biology** 31:1353-1365.e3.  
<https://doi.org/10.1016/j.cub.2020.12.043>

**2020**

Hedrick BP, Mutumi GL, Munteanu VD, **Sadier A**, Davies KTJ, Rossiter SJ, Sears KE, Dávalos LM, Dumont E. 2020. Morphological Diversification under High Integration in a Hyper Diverse Mammal Clade. *J Mammal Evol* 27:563–575 <https://doi.org/10.1007/s10914-019-09472-x>

Vial, J., Royet, A., Cassier, P., Tortereau, A., Dinvaut, S., Maillet, D., Gratadou-Hupon, L., Creveaux, M., **Sadier, A.**, Tondeur, G., et al. (2019). The Ectodysplasin receptor EDAR acts as a tumor suppressor in melanoma by conditionally inducing cell death. **Cell Death Differ** 26, 443–454.  
<https://doi.org/10.1038/s41418-018-0128-1>

**2019**

**Sadier, A.**, Twarogowska, M., Steklikova, K., Hayden, L., Lambert, A., Schneider, P., Laudet, V., Hovorakova, M., Calvez, V., and Pantalacci, S. (2019). Modeling Edar expression reveals the hidden dynamics of tooth signaling center patterning. **PLoS Biol** 17, e3000064  
<https://doi.org/10.1371/journal.pbio.3000064>

## 2018

**Sadier\***, A., Davies\*, K.T., Yohe, L.R., Yun, K., Donat, P., Hedrick, B.P., Dumont, E.R., Davalos, L.M., Rossiter, S.J., and Sears, K.E. (2018). Multifactorial processes underlie parallel opsin loss in neotropical bats. **Elife** 7. <https://elifesciences.org/articles/37412>

Hedrick, B.P., Yohe, L., Vander Linden, A., Davalos, L.M., Sears, K., **Sadier, A.**, Rossiter, S.J., Davies, K.T.J., and Dumont, E. (2018). Assessing Soft-Tissue Shrinkage Estimates in Museum Specimens Imaged With Diffusible Iodine-Based Contrast-Enhanced Computed Tomography (diceCT). **Microsc Microanal** 24, 284–291. <https://doi.org/10.1017/s1431927618000399>

## Before 2018

Urban, D.J., Anthwal, N., Luo, Z.-X., Maier, J.A., **Sadier, A.**, Tucker, A.S., and Sears, K.E. (2017). A new developmental mechanism for the separation of the mammalian middle ear ossicles from the jaw. **Proc Biol Sci** 284. <https://doi.org/10.1098/rspb.2016.2416>

Gibert, Y., Samarut, E., Pasco-Viel, E., Bernard, L., Borday-Birraux, V., **Sadier, A.**, Labbe, C., Viriot, L., and Laudet, V. (2015). Altered retinoic acid signalling underpins dentition evolution. **Proc Biol Sci** 282. <https://royalsocietypublishing.org/doi/10.1098/rspb.2014.2764>

**Sadier, A.**, Lambert, E., Chevret, P., Decimo, D., Semon, M., Tohme, M., Ruggiero, F., Ohlmann, T., Pantalacci, S., and Laudet, V. (2015). Tinkering signaling pathways by gain and loss of protein isoforms: the case of the EDA pathway regulator EDARADD. **BMC Evol Biol** 15, 129. <https://doi.org/10.1186/s12862-015-0395-0>

Pantalacci, S., Chaumot, A., Benoit, G., **Sadier, A.**, Delsuc, F., Douzery, E.J.P., and Laudet, V. (2008). Conserved features and evolutionary shifts of the EDA signaling pathway involved in vertebrate skin appendage development. **Mol Biol Evol** 25, 912–928. <https://doi.org/10.1093/molbev/msn038>

## Review articles:

### 2020

**Sadier A.**, Urban DJ, Anthwal N, Howenstine AO, Sinha I, Sears KE, Sadier A, Urban DJ, Anthwal N, Howenstine AO, Sinha I, Sears KE. 2020. Making a bat: The developmental basis of bat evolution. **Genetics and Molecular Biology** <http://dx.doi.org/10.1590/1678-4685-gmb-2019-0146>

**Sadier A.**, Sears, K. and Womack, M. Unravelling the heritage of lost traits, **J Exp Part B.** <https://doi.org/10.1002/jez.b.23030>

**Sadier A.**, Santana S., Sears K. The role of core and variable Gene Regulatory Network modules in tooth development and evolution (2020) **Integrative and Comparative Biology**, icaa116 <https://doi.org/10.1093/icb/icaa116>

**Sadier, A.**, Jackman, W.R., Laudet, V and Gibert, Y. Vertebrate tooth type: is it signaled by a single organizing tooth? (2020) **BioEssays** 42 (6), 1900229 <https://doi.org/10.1002/bies.201900229>

C Darrin Hulsey, Karly E Cohen, Zerina Johanson, Nidal Karagic, Axel Meyer, Craig T Miller, **Alexa Sadier**, Adam P Summers, Gareth J Fraser (2020) Grand Challenges in Comparative Tooth Biology **Integrative and Comparative Biology** icaa038 <https://doi.org/10.1093/icb/icaa038>

### Before 2020

Sears, K., Maier, J.A., **Sadier, A.**, Sorensen, D., and Urban, D.J. (2018). Timing the developmental origins of mammalian limb diversity. **Genesis** 56. <https://doi.org/10.1002/dvg.23079>

**Sadier, A.**, Viriot, L., Pantalacci, S., and Laudet, V. (2014). The ectodysplasin pathway: from diseases to adaptations. **Trends Genet** 30, 24–31. <https://doi.org/10.1016/j.tig.2013.08.006>

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## BOOK CHAPTERS

**Sadier, A.** (2019). How Do Gene Networks Promote Morphological Evolution. In Old Questions and Young Approaches to Animal Evolution, J.M. Martín-Durán, and B.C. Vellutini, eds. (Cham: Springer International Publishing), pp. 209–234.

**Sadier, A.A.** (2016). Regulatory and Coding Changes in Developmental Evolution, Roles of. In Encyclopedia of Evolutionary Biology, R.M. Kliman, ed. (Oxford: Academic Press), pp. 433–440.

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## CONFERENCE PRESENTATIONS

- 2<sup>nd</sup> Asia Evo conference – oral communication - invited speaker August 2021:** Sadier Alexa, Sharlene Santana, Paul François and Karen Sears Understanding the GRN behind bat molar extreme diversification
- Bat1K symposium batellite meeting – oral communication:** Sadier Alexa, Sharlene Santana, Paul François and Karen Sears Understanding the GRN behind bat molar extreme diversification
- SRC Pop-up Early career symposia 2020 / evo-devo – oral communication – invited speaker:** Sadier Alexa, Andrew Krause, Dessalles Renaud, Nieves Natalie, Santana Sharlene and Karen Sears Bat teeth at the cusp: Finding new rules for the patterning of post-canine teeth in mammals
- SICB 2020 – oral communication – invited speaker:** Sadier Alexa, Krause Andrew, Dessalles Renaud, Nieves Natalie, Santana Sharlene and Karen Sears Finding new rules for the patterning of post-canine teeth in mammals
- TMD 2019 – oral communication:** Sadier Alexa, Dessalles Renaud, Nieves Natalie, Santana Sharlene and Karen Sears Finding new rules for the patterning of post-canine teeth in mammals: insights from Noctilionoid bats
- ICVM 2019 – oral communication – invited speaker:** Sadier Alexa, Dessalles Renaud, Nieves Natalie, Santana Sharlene and Karen Sears Finding new rules for the patterning of post-canine teeth in mammals: insights from Noctilionoid bats
- NASBR 2018 – oral communication:** Sadier Alexa, Dessalles Renaud, Nieves Natalie, Santana Sharlene and Karen Sears Finding new rules for the patterning of post-canine teeth in mammals: insights from Noctilionoid bats
- NASBR 2018 – poster:** Sadier, Alexa; Sears, Karen New developmental constrained for the establishment of the molar row in Noctilionoid bats Deciphering genomic and developmental mechanisms that underlie vision adaptations in noctilionoid bats
- EuroEvoDevo 2018 – oral communication:** Sadier Alexa, Dessalles Renaud, Nieves Natalie, Santana Sharlene and Karen Sears Finding new rules for the patterning of post-canine teeth in mammals: insights from Noctilionoid bats
- LASDB 2017 – oral communication:** Sadier Alexa, Santana Sharlene and Karen Sears Establishing dental patterning in noctilionoid bats
- PanAmEvoDevo 2017 - oral communication:** Sadier, Alexa; Davalos, Liliana; Dumont, Elizabeth; Rossiter, Stephen; Sears, Karen Deciphering genomic and developmental mechanisms that underlie vision adaptations in noctilionoid bats
- PanAmEvoDevo 2017 - poster:** Sadier, Alexa; Sears, Karen New developmental constrained for the establishment of the molar row in Noctilionoid bats Deciphering genomic and developmental mechanisms that underlie vision adaptations in noctilionoid bats
- Morphogenesis workshop MBI 2017 - poster:** Sadier, Alexa; Santana Sharlene, Sears, Karen Modeling the developmental foundations of adaptive radiation
- EuroEvoEvo 2016 - oral communication:** Sadier, Alexa; Davalos, Liliana; Dumont, Elizabeth; Rossiter, Stephen; Sears, Karen Deciphering genomic and developmental mechanisms that underlie vision adaptations in noctilionoid bats
- PanAmEvoEvo 2015 - poster:** Sadier A, Lambert E, Chevret P, Décimo D, Semon M, Tohmé M, Ruggiero F, Ohlman T, Pantalacci S, Laudet V. Tinkering signaling pathways by gain and loss of protein isoforms: the case of the EDA pathway regulator EDARADD.
- SMBE 2013 - oral communication:** Sadier A, Pantalacci S, Besson M, Ohlmann T, Pantalacci S and Lauvet V How conserved signaling pathways drive diversification: lessons from a phylogenetic-functional approach
- TMD Tooth morphogenesis and differentiation 2013 - poster:** Sadier A, Lambert A, Peltier M, Laudet V and Pantalacci S Edar highlights the dynamics of molar row patterning

**Euro Evo Devo 2012** - poster: Sadier A, Besson M, Chevret P, Ohlmann T, Pantalacci S and Laudet V Mosaic evolution through gain/loss of protein isoforms: the case of EDARADD involved in epithelial appendages development

**2nd Joint Meeting of the British and French Societies for Developmental Biology 2011** - poster: Sadier A, Lambert A, Laudet V and Pantalacci S Edar as a positive regulator of tooth patterning.

**Euro Evo Devo 2010** - poster: Sadier A, Chevret P, Lambert A, Pantalacci S and Laudet V Evolution through gain/loss of protein isoforms: the case of EDARADD involved in epithelial appendages development

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## INVITED SEMINARS

**2021** Bat (teeth) as a new eco-evo-devo system for the evolution of developmental rules **ISEM Université de Montpellier, France**

**2020** Bat teeth at the cusp: Finding new rules for the patterning of post-canine teeth in mammals, **McGill University, Montréal, Canada**

**2019** Deciphering the rules that underlie species diversity: insight from African bats, **CBI, Yaoundé, Cameroon**

**2019** Deciphering the rules that underlie species diversity: insight from Trinidadian bats, **University of St Augustine, Trinidad**

**2016** Deciphering genomic and developmental mechanisms that underlie adaptive evolution in noctilionoid bats - **Indiana State University**

**2013** Evo-devo of the Eda pathway, from the evolution of signaling to the establishment of shape - **University of Utah**

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## TEACHING EXPERIENCE AND MENTORING

### Teaching

**2021** **UCLA – MCB 160 Light microscopy, guest lecture** – “Deep DIVE into bi-photon imaging”

**2020** **UCLA – MCB 160 Light microscopy, guest lecture** – “Deep DIVE into bi-photon imaging”

**2019** **UCLA - Fiat Lux Class, invited lecture** – how to be a field scientist

**2016** **UIUC – IB202 Anatomy and Physiology class**

**2013** **COMENIUS project** - Visiting researcher in high school for the European project COMENIUS [http://ec.europa.eu/education/lifelong-learning-programme/comenius\\_en.htm](http://ec.europa.eu/education/lifelong-learning-programme/comenius_en.htm)

**2009-2012** **ENS Lyon, France – Teaching fellowship “monitorat”**

\*Full lecture – Next generation sequencing, applications and evolution – master level

\*Full lecture – Genomic technics and GMO

\*In-class activity: hormone and pathology, evolution of nuclear receptors,

\*Development and supervision of a whole teaching course for Bachelor and Master

\*Lab activities: 2/3 weeks lab session full time

\*Med school teaching - TA

**Total hours of teaching: 232 hours**

### Mentoring

#### PhD students

**2020** **Aidan Howenstine UCLA PhD student** – experiment, review writing  
Dissertation project “The developmental networks behind limb development”  
Mentoring, Fieldwork training and mentoring.

**2019** **Clive Lau, UCLA PhD student** – fieldwork training and mentoring.  
Lab mentoring.

**2018** **Kathryn Stanchack UW, PhD student** – fieldwork training and mentoring.

#### Undergraduates and master students

**Since 2020** **Juan Mendez** – undergraduate, UCLA – project conception, full supervision

**2017** **Natalie Nieves** – undergraduate, fieldwork in Puerto Rico, summer internship in the lab, co-author (to be published).

- 2017-2020 Jacqueline Piekos, undergrad** – mentoring, full mentoring on lab project. Fieldwork training and mentoring.
- 2018-2020 Michael Koger UCLA undergrad** - technics: morphometrics, molecular biology, project development, thesis writing, mentoring, *soon to be co-author*.  
Thesis: « Developmental basis of cochlea evolution in bats »
- 2015-2017** Supervision et co-supervision of **10 undergrads - UIUC**.  
**Kun Yun** Full supervision, *co-author* (Sadier *et al.* 2018), now PhD student at Mayo Clinic.  
**Elliot Berger** Full supervision, now in med school, *soon to be co-author*.
- 2011 Marc Besson** – Evo-devo of ectodermal appendages: *Edaradd* isoforms  
Full supervision (master 1 student). Project, experiments, writing.

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## OUTREACH

### Main outreach achievements

**2021 Coach for the iBiology “Share Your Research competition”** <https://www.ibiology.org/syr-competition/>

**Since 2019 Co-host of the French science podcast: Podcast Science**  
<https://www.podcastscience.fm/> (~10k listeners per episode, 50k per month)

**2017 TEDx speaker** at TEDx Chamonix - <https://www.youtube.com/watch?v=kFctP0vKL-4>

### Interviews, other outreach events

**2021** Interviewed for the **podcast RadioBioClub** – UC Merced (to be published)

**2020 Skype a scientist** – 3 classes “How to make a bat?”

**2019 Exploring Your Universe** – UCLA outreach event <https://www.exploringyouruniverse.org>

**2019** Interviewed by **Podcast Science** about bats and bat research (in French):

<https://www.podcastscience.fm/emission/2019/04/15/podcast-science-370-chauve-souris/>

**2019** Interviewed by the podcast **The Naked Scientists** about our eLife manuscript (see publications)  
<https://www.thenakedscientists.com/articles/interviews/evolution-through-bats-eyes>

**2017 Urbana Library Bats**, these fascinating animals

**2015-2017 IGB genome day** - Animation and creation of an outreach module

**2009-2013 Fête de la science** – annual outreach science festival, Lyon, France

### Twitter collaborative accounts

**2017** La bio au labo @laBioauLabo (French equivalent of @realscientist)

**2016** En direct du labo (French equivalent of @biotweeps)

### Public lectures

**2007 and 2009** General scientific popularization seminar at the Réserve Naturelle des Aiguilles Rouges, Chamonix

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## FIELDWORK

- 2019 Cameroon** – trip co-organizer, field co-coordinator, responsible for exporting the samples, translator (French), bat capture, experiments, local reciprocal knowledge sharing and support
- 2019 Trinidad** – trip organizer, including permit requests, exporting the samples, establishing local contact, support and reciprocal knowledge sharing
- 2019 Dominican Republic** – trip organizer, including permit requests, exporting the samples, local contact, support and collaboration
- 2018 Dominican Republic and Trinidad** – trip organizer, including permit requests, exporting the samples, local contact, support and collaboration
- 2017 Puerto Rico, Dominican Republic and Trinidad** – field research, experiment, co-organizer
- 2017 Belize** – field research in Lamanai, organized by Dr. Brock Felton and Dr. Nancy Simmons
- 2016 Puerto Rico and Belize**

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## MUSEUM COLLECTIONS WORK

**2018** Field museum, Chicago

**2016** American Museum of Natural History – New York City

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## ACADEMIC ACTIVITIES AND SERVICE

**Since 2021: Editorial Board Member, BMC Eco Evo** <https://bmcecoevol.biomedcentral.com/>

**2021: Topic board editor, Diversity journal diversity** <https://www.mdpi.com/journal/diversity>

**Since 2019: The Company of Biologists Prelighter, part of the @preLights community** - See my prelights here: <https://prelights.biologists.com/profiles/aigverte/>

**Society member:** EuroEvoDevo, PanAmEvoDevo, NASBR societies, SDB and BCI (Bat Conservation International), Bat1k genome project

### Symposium and conference organizer

**2018 Evolution - S-24** Evolution and development in deep time, merging insights from paleontology and developmental biology **with Ryan Felice, Montpellier, France**

**2013 – TMD - Organizing committee**

**Reviewer for academic journals** – eLife, BMC Evolutionary Biology, Proceeding of the Royal Society B, Evolution, Plos One, ICB, System Biology

**Representative of the PhD students** (elected) for the doctoral school Integrative Molecular and Cellular Biology (including meeting organisation (2009-2013))

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## COLLABORATORS

Sharlene Santana (UW), Elizabeth Dumont (UC Merced), Vincent Laudet (OIST), Sophie Pantalacci (LBMC, ENS Lyon), Yann Gibert (UMC), Liliana Davalos (Stony Brook University), Paul François (Mc Gill), Andrew Krause (University of Oxford Mathematical Institute), Shane Campbell-Staton (UCLA), Neal Anthwal (King's college London), Nancy Simmons (AMNH), Robert Haase (Dresden), Aidan Couzens (UCLA), Guillaume Billet (MNHN, Paris), Helder Gomes-Rodrigues (MNHN, Paris).

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## LANGUAGES

French (native), English (fluent), Spanish (beginner)

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## REFERENCES

**Karen Sears** – Professor, UCLA Chair, Dpt Ecology and Evolutionary Biology; [ksears@ucla.edu](mailto:ksears@ucla.edu)

**Sharlene Santana** – Professor, University of Washington; [ssantana@uw.edu](mailto:ssantana@uw.edu)

**Sophie Pantalacci** – Group leader, CR, LMBC, ENS Lyon; [sophie.pantalacci@ens-lyon.fr](mailto:sophie.pantalacci@ens-lyon.fr)

**Vincent Laudet** – Professor, OIST, Okynawa, Japan; [vincent.laudet@obs-banyuls.fr](mailto:vincent.laudet@obs-banyuls.fr)