

Eric CLUA

Doctor of veterinary Med
Professor of Marine Biology
Shark specialist

Born on the 16 July 1964 in France
2 children. Single

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LANGUAGES



ACADEMIC TRAINING : Biological/Ecological Sciences and Economics

	June 2015	Recruitment as « Professor of University » at the Ecole Pratique des Hautes Etudes (Perpignan, Scientific Unit 3248 CNRS), in the field of shark ecology, biology and behaviour.
	February 2001 to Jan. 2004	PhD with honors from the Ecole Pratique des Hautes Etudes (EPHE) in « Life and Earth Sciences ». Laboratory: UMR 8046 CNRS/EPHE « Tropical and Mediterranean ichthy-ecology » – University of Perpignan – PhD supervisor: Pr René Galzin. <i>Title of thesis:</i> Clua, E. (2004) Relative influence of ecological and fishing factors on the structure of reef fishes from six artisanal fisheries in the Kingdom of Tonga (South Pacific). EPHE. 226 pp.
	Sept. 98 to July 2000	Master degree from the Ecole Pratique des Hautes Etudes (EPHE) . Laboratory: UMR 8046 CNRS/EPHE « Tropical and Mediterranean ichthyocology ». Supervisor: Pr René Galzin. <i>Title master thesis:</i> Clua, E. (2000) Contribution to the knowledge of species diversity of hard bottom fishes in the Islamic Republic of Mauritania. Master degree EPHE. 115 pp.
	June 2013	Qualified as PhD supervisor (HDR) in the field of marine ecology and environmental economics, obtained from the University of Perpignan Via Domitia. <i>Title:</i> Clua, E. (2013) Contribution to the justification and implementation of a conservation policy and sustainable development of carnivorous shark populations. HDR, UPVD. 46 pp.
	1989-1991	Graduated from the Ecole Supérieure des Sciences Economiques et Commerciales (ESSEC) in Cergy-Pontoise (95) - Paris - France. <i>Option:</i> Macro and micro economics. One 6-month term of Master of Business Administration in HEC Montreal (Quebec – Canada).
	1985-1989	Graduated as Doctor of Veterinary medicine from the Ecole Nationale Vétérinaire de Toulouse (ENVT) (31) - France. <i>Title of thesis:</i> Clua, E. (1993) Setting up of a proteinic complement for the use of banana wastes in the feeding process of Saddle back pigs in the Commonwealth of Dominique (West Indies). Veterinary thesis. 80 pp.

COMPLEMENTARY ACADEMIC TRAININGS

	May/Sept. 2003	Numerical ecology – Multivariate statistical analysis. 2-month training in the University of Montreal – Laboratory of Pr Pierre Legendre.
	Sept. 1998	Remote sensing and Geographical Information Systems applied to the management of natural resources. 3-week training by the Centre National de l'espace (CNES) à Toulouse (31).
	Sept. 1996	Environmental economics and management of renewable energies. 2-week training by Dr Jacques Weber at the CIRAD-Green in Montpellier (34).

MAIN PROFESSIONAL EXPERIENCE

Duration :	Open	Period :	sept 2016 to now
Position :	Professor at the Ecole Pratique des Hautes Etudes		
Location:	Perpignan (France) and Moorea (French Polynesia)		
Contractor:	Ministry of Post-graduate Education and Scientific Research		
Status:	A+ french civil servant		
Duty:	Coordination and implementation of international projects on coral reef sustainable development		
Job description :	<ol style="list-style-type: none">1. Setting up and implementing scientific programmes aiming at supporting shark conservation and sustainable development through the combination of an ecological, economical and anthropological approach, in French Polynesia, New Caledonia, the Eastern Tropical Pacific (Clipperton) and the Caribbean (Guadeloupe) ;2. Academic training of students (Master 1, Master 2, PhD and post-doctoral)		

Duration :	4 years	Period :	Sept 2012 to sept 2016
Position :	Scientific advisor of the High Commissioner of the French Republic ('DRRT')		
Location:	Papeete (French Polynesia)		
Contractor:	Ministry of Post-graduate Education and Scientific Research		
Status:	A+ french civil servant		
Duty:	Represent the French Ministry of Post-graduate Education and Research		
Job description :	<ol style="list-style-type: none">1. Management of the public funding ('CPER' and Ministry of Oversea territories fundings) for supporting Research and Innovation (R&I) in French Polynesia; in charge of setting up a 'Strategic plan for R&I in French Polynesia (2015-2025)';2. Support to the implementation of the Fioraso law (2013) in French Polynesia (in particular the setting up of a « site policy » and institutional synergies) ;3. Management of the annual tender for the subsidies to create innovative companies (OSEO/BPI France) ;4. Support of web-based education programmes in French Polynesia ;5. In charge of delivering scientific permits for foreign scientists in French Polynesia.		

Duration :	7 years	Period :	April 2005 to June 2012
Position :	Head of programme for the « Coral Reef Initiatives of the Pacific » (CRISP)		
Location:	Noumea (New Caledonia)		
Contractor:	Secretariat of the Pacific Community (SPC) – Regional organization		
Status:	International civil servant		
Duty:	Coordinate and evaluate an international programme on sustainable development of coral reefs		
Job description :	<ol style="list-style-type: none">1) Coordination of 20 implementing agencies that have achieved over 80 projects in 15 Pacific countries and territories (including the French OCTs New Caledonia, French Polynesia and Wallis&Futuna). Core funding of 9 M€ and total funding of 15 M€.2) Political rooting of the programme in the three French OCTs and 12 English-speaking Pacific islands, in coordination with the French embassies in Suva (Fiji), Wellington (New Zealand), Canberra (Australia) and Port-Moresby (Papua-New-Guinea) and Under the auspices of the French Ambassador for the Pacific (Permanent Secretariat for the Pacific).3) Monitoring&Evaluation of the scientific production of eight Research Units including three from IRD -UR128 (IRD) under the leadership of Jocelyne Ferraris, UR152 (IRD) under the leadership of Cécile Debitus, US140 ESPACE (IRD) under the leadership of Frédéric Huyn-, two UR from CNRS -UMR5044 EPHE-CNRS-UPVD under the leadership of René Galzin et USR3270 CNRS-EPHE-CRIOBE under the leadership of Serge Planes- two UR from the South Pacific University and New Caledonia University UNC, one UR from the World Fish Center and three Non Governmental Agencies (Conservation International, WWF and Fondation for the South Pacific People International - FSPI).4) Reinforcement of capacity building and training of post-graduate students 60 students (including 10 PhD) trained in 6 years, including 25 Pacific islanders mainly from the University of the South Pacific. Support to 40 scientific workshops that contributed to the training of over 1000 actors of the marine ecosystem management in the South Pacific.5) Development of international partnerships between the CRISP programme and complementary projects (World Bank, Asian Development Bank, etc.) and other countries with political interests in the South Pacific (Australia, Japan, New Zealand). NB : the CRISP was at the initiative of the very first path in 2008 for a bilateral cooperation between France and Australia for the sustainable development of the Coral Sea.		

- 6) **Generate additional fundings** to the core funding (AFD and FFEM) and co-funding (provided by Conservation International, WWF, United Nations Environmental Programme UNEP) through partnerships with other funding agencies (NZAid, AUSAid, USAid). Anticipation of post-CRISP programme building up on CRISP results: contribution of the setting up of INTEGRE project (12 M€ on the Xth European Development Fund - EDF) and conception of the RESCCUE project (5 M€ from AFD and Fonds Français pour l'Environnement Mondial – FFEM).
- 7) **Promotion and representation of the CRISP programme** in the international meetings, including the management of the commission of the ICRI (*International Coral Reef Initiative*) in charge of shark conservation and mitigation of Climate Change effects on reef fisheries.
- 8) **Create and develop Partnerships between Public and Private operators** (PPP concept) in the field of sustainable aquaculture practices for the supply of Aquarium Fish Trade.

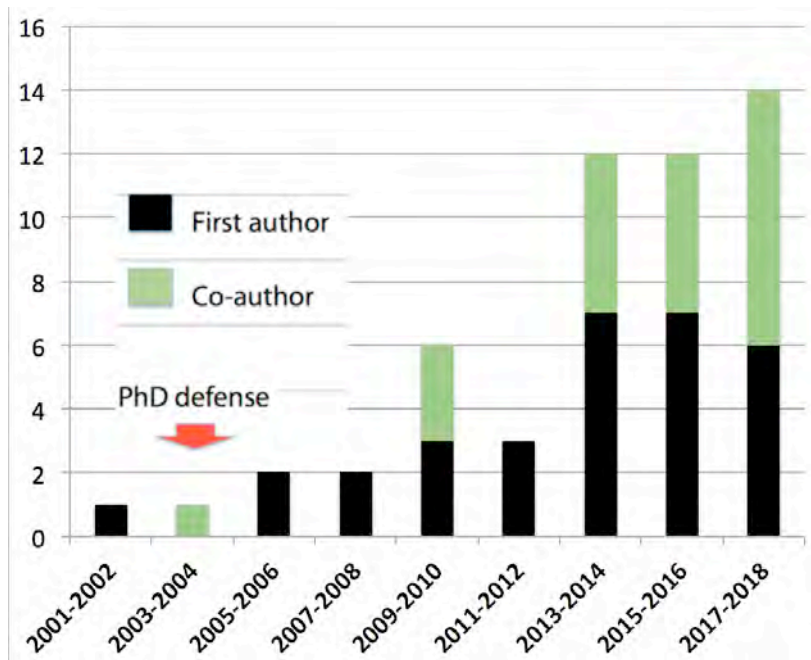
Duration	0.4 year	Period:	Aug 2003 to Dec 2003
Position :	Marine ecology PhD student		
Location:	Perpignan		
Contractor :	UMR8046 EPHE-CNRS – Laboratoire d'éco-ichtyologie tropicale et méditerranéenne		
Duty:	Finalize a PhD in coral reefs ecology		
Job	<ul style="list-style-type: none"> • Data analysis ; discussion of results 		
description:	<ul style="list-style-type: none"> • Submission of 2 international standard publications 		

Duration	2,5 years	Period:	Feb 2001 to Jul 2003
Position :	Fellow marine ecology researcher		
Location:	Noumea (New Caledonia)		
Contractor:	Secretariat of the Pacific Community (SPC) – Regional organization		
Duty:	In charge of the eco-fishing component of the DemEcoFish Project (Demography and Ecology for assessing the coastal Fishery resources), funded by the McArthur Foundation (2001-2004)		
Job	<ol style="list-style-type: none"> 1) 60%: definition and testing of methodology for field data collection (fish stocks and ecosystem characterisation). Preparation and participation to 5 x 3-week missions in Fiji and Tonga. Field data collection and database processing. Data analysis. 2) 20%: contribution to other SPC programs. Directing and editing of 2 institutional movies about sustainable management of reef resources (see references chapter 8). 3) 20%: contribution to the PNEC (Programme National de l'Environnement Côtier) in New Caledonia: identification of indicators of fishing pressure in reef fisheries. 		
description:			

GENERAL PRODUCTIVITY IN SCIENTIFIC RESEARCH

Preliminary remarks

My unique term as a full time researcher has been as a PhD student seconded by the UMR CNRS-EPHE 8046 in order to conduct my PhD (2001-2004). Before Sept. 2016, all my research activity was then conducted on a partial and mainly free time basis during my contract at the Secretariat of the Pacific Community (SPC) (New Caledonia) (2005-2012) and my past position as scientific advisor (DRRT) for the High Commissioner for the French Republic in Papeete (French Polynesia).



Without any full time position as researcher, I have achieved an average (for the past four years) of six peer-reviewed publications per year (with the last 2-year impact factor of 4.31)

Overview:

French Polynesia (Eastern Pacific): I developed a strong collaboration with the UMR8046 CNRS-EPHE regarding the ecology and resilience of coastal sharks such as the **lemon shark *Negaprion acutidens***, and the **blacktip shark *Carcharhinus melanopterus*** in the context of anthropogenic pressure such as **artificial provisioning for ecotourism purposes**. We developed a 5-year study focusing on the effects of a daily feeding of a lemon shark population (Buray et al. 2009, Clua et al. 2010a, 2010b, Clua 2018).

Around the world: since 2007, I developed a strong expertise in **shark behavior and a better understanding of the agonistic behavior toward humans**, in particular fatal bites by large sharks. I was appointed in 2013 as **forensic and legal medicine expert for the Court in Papeete** regarding shark attacks and other harmful marine animals for humans. I am an associate member of the **International Shark Attacks Files (ISAF, Dr Georges Burgess)**, based at the University of Florida. I authored >5 peer-reviewed articles and three expert reports on the subject of fatal attacks on humans. I recently published an article about the concept of 'problem-individuals' among shark population and its management (Clua and Linnell, 2018).

Peer-reviewed publications (my students in bold)

Reference	IF
Clua, E. G. and Linnell, D. C. (2018). Individual shark profiling: an innovative and environmentally responsible approach for selectively managing human fatalities. <i>Conservation Letters</i> . DOI: 10.1111/conl.12612	7,3
Torrente, F. , Bambridge, T., Planes, S., Guiart, J., & Clua, E. G. (2018). Sea Swallowers and Land Devourers: Can Shark Lore Facilitate Conservation? <i>Human Ecology</i> , 1-10.	1,7
Clua, E. (2018). Managing bite risk for divers during shark feeding ecotourism: a case study from French Polynesia. <i>Tourism management</i> . 68, 275-283.	5,1
Brena P.F., Mourier J., Planes S., Clua E.E. (2018) Concede or clash? Solitary sharks competing for food assess rivals to decide. <i>Proc. R. Soc. B</i> . 285: 20180006. http://dx.doi.org/10.1098/rspb.2018.0006	5,7
Jublier, N. and Clua, E. (2018). Size Assessment of the Gray Reef Shark <i>Carcharhinus amblyrhynchos</i> Inferred from Teeth Marks on Human Wounds. <i>Journal of Forensic Science</i> , doi: 10.1111/1556-4029.13738.	1,2
Clua, E., Galves, J. B., and Werry, J. M. (2014) Insight into cumulative intra-guild and intra-specific depredation among sharks. <i>Cybium</i> 38(4): 311-313.	0,5
Clua, E., Bescond, P. M. and D. Reid (2014) Fatal attack by a juvenile tiger shark, <i>Galeocerdo cuvier</i> , on a young male kitesurfer in a reef passage of New Caledonia (South Pacific). <i>Journal of Forensic and Legal Medicine</i> . DOI : 10.1016/j.jflm.2014.04.005	1,1
Clua, E. and D. Reid (2013) Features and motivation of a fatal attack by a juvenile white shark, <i>Carcharodon carcharias</i> , on a young male surfer in New Caledonia (South Pacific). <i>Journal of Forensic and Legal Medicine</i> . DOI : 10.1016/j.jflm.2013.03.009	1,1
Clua, E., Buray, N. , Legendre, P., Mourier, J. and Planes, S. (2010a) Effects of provisioning on shark behaviour: Reply to Brunnschweiler & McKenzie (2010). <i>Mar. Ecol. Prog. Ser.</i> 420 :285-288 .	2,63
Clua, E., Buray, N. , Legendre, P., Mourier, J. and Planes, S. (2010b) Behavioural response of sicklefin lemon sharks (<i>Negaprion acutidens</i>) to underwater feeding for ecotourism purposes. <i>Mar. Ecol. Prog. Ser.</i> 414 :257-266.	2,63
Clua, E. and B. Séret (2010). Unprovoked fatal shark attack in Lifou island (Loyalty Islands, New Caledonia, South Pacific) by a Great White Shark, <i>Carcharodon carcharias</i> . <i>American Journal of Forensic Medicine and Pathology</i> . 31 (3), 281-286.	0,71
Buray, N. , Mourier, J., Planes, S. and Clua, E. (2009) Underwater photo-identification of sicklefin lemon sharks, <i>Negaprion acutidens</i> , at Moorea (French Polynesia). <i>Cybium</i> 33, 21-27.	0,5

Book

Clua, E., & Reid, D. (2018) Contribution of Forensic Analysis to Shark Profiling Following Fatal Attacks on Humans. Post Mortem Examination and Autopsy-Current Issues - From Death to Laboratory Analysis. (Ed. Kamil Hakan Dogan), Chapter 5, pp. 57-75. InTech Open Science. <http://dx.doi.org/10.5772/intechopen.71043>

Clua, E. and Guiart, J. (2015) Requins en Océanie : eco-anthropologie d'un prédateur marin. Te Pito O Te Fenua. Papeete. 100 pp. + 50 illustrations

Expert reports

- Clua, E. (2014) Analysis of the bites on divers by sicklefin lemon sharks, *Negaprion acutidens*, involved in shark-feeding operations for ecotourism purposes in Bora-Bora (French Polynesia). Expert report. 10 pp.
- Clua, E. (2011a) Identification of the shark (species, size) involved in the fatal shark attack on the 1st of August, 2011 in Seychelles. Expert report. Government of Seychelles. 8 pp.
- Clua, E. (2011b) Identification of the shark (species, size) involved in the fatal shark attack on the 16th of August, 2011 in Seychelles. Expert report. Government of Seychelles. 4 pp.
- Clua, E. (2011c) Features and motivations of a non-fatal attack by a grey reef shark, *Carcharhinus amblyrhynchos*, on a spearfisherman in New Caledonia (South Pacific). Expert report for the ISAF. 2 pp.

Oral presentations in international meetings

Year	Name of congress/Symposia/Workshop
2018	<i>Sharks International Conference</i> , 5-10 th June, Joao Do Poesa, Brazil. Plenary presentation « Understanding and managing shark attacks on humans : behavioral individuality vs general ecology» Clua E.
2016	<i>International French Ecology Society Workshop</i> , 23-27 th October, Marseille, France. « Understanding and managing shark attacks on humans : behavioral individuality vs general ecology» Clua E.
2014	<i>Regional Pacific Shark Workshop</i> , 14-17 th October, Moorea, French Polynesia. « Shark-based ecotourism in the South Pacific : toward the Payment for Ecosystem Services ? » Clua E.
2014	<i>Sharks International Conference</i> , 2-6 th June, Durban, South Africa. « Shark-eat-shark on a single hook : insight into intra-guild depredation among adult animals » Clua E. et al.
2011	<i>Sharks International Conference</i> , 6-11 th June, Cairns, Australia. « Business Partner or simple prey ? The economic value of lemon shark in French Polynesia » Clua E. et al.

DOMAIN 2 : ECOLOGY AND BIOLOGY OF CORAL REEF FISHES

Preliminary background: tropical ichthy-ecology and reef fisheries resources

Overview (see table here below for references):

After obtaining a EPHE Master degree in ichthyology in Western Africa (Clua 2000) and a EPHE PhD in ichthy-ecology in the Kingdom of Tonga (Clua 2007), I strengthened my expertise in the sustainable development of reef fish populations under fishing pressure, with a focus on assessing **reef fish diversity** and resilience (Randall&Clua et al. 2004, Clua et al. 2015, Clua et al. 2016) and setting up tools for **management of reef fisheries** (Clua et al. 2006a, Clua et al. 2006b, Clua and Legendre 2008). I also contributed to a review on techniques that aim at decreasing the fishing pressure on reef fishes captures for the aquarium trade (Bell&Clua et al. 2009). More recently, I focused on the management of the risk of Ciguatera Fish Poisoning in the South Pacific as a side field of reef fisheries management (Clua et al. 2012).

Peer-reviewed publications (my students in bold)

References	IF
Clua, E., Bessudo S., Labrecque M., and Hoyos-Padilla, M. (2016) First record of giant trevally (<i>Caranx ignobilis</i>) around the Clipperton Atoll-La Passion Island (North-Eastern Tropical Pacific). <i>Cybium</i> , 40(3): 259-260.	0,5
Clua, E., Chauvet, C., Mourier, J., Werry, J. M. and Randall, J. E. (2015) Pattern of Movements from a home reef in the Chesterfield Islands (Coral sea) by the Giant Grouper, <i>Epinephelus lanceolatus</i> . <i>Aquat. Liv. Res.</i> 28, 53–58. DOI: 10.1051/alr/2015006	1,23
Clua, E., Brena, P. F., Lecable, C., Ghnassia, R. and Chauvet, C. (2012) Prevalence and proposal for cost-effective management of the ciguatera risk in the Noumea fish market, New Caledonia (South Pacific). <i>Toxicon</i> 58 : 591-601.	2,74
Bell, J. D., E. Clua, C. A. Hair, R. Galzin and P. J. Doherty (2009). The capture and culture of postlarval fish and invertebrates for the marine ornamental trade. <i>Reviews in Fisheries Science</i> . 17(2) : 223-240.	1,94
Clua, E. and P. Legendre (2008). Shifting dominance among scarid species on reefs representing a gradient of fishing pressure. <i>Aquatic Living Ressources</i> , Vol. 21 (3):339-348.	1,23
Clua, E. (2007). Influence relative des facteurs écologiques et de la pêche sur la structuration des stocks de poissons récifaux dans six pêcheries du royaume des Tonga (Pacifique sud). <i>Cybium</i> : 31(1) :	0,5

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Clua, E., P. Legendre, L. Vigliola, F. Magron, M. Kulbicki, S. Sarramegna, P. Labrosse and R. Galzin. (2006). Medium-scale approach (MSA) for improved assessment of coral reef fish habitat. <i>Journ. of Exper. Mar. Biol. and Ecol.</i> 333: 219-230.	2,12
Clua, E., B. Beliaeff, C. Chauvet, G. David, J. Ferraris, M. Kronen, M. Kulbicki, P. Labrosse, Y. Letourneur, D. Pelletier, O. Thébaud and M.Léopold. (2006). Toward multidisciplinary indicator dashboards for coral reef fisheries management. <i>Aquat. Living Resour.</i> 18: 199-213.	1,23
Randall, J.E., Smith, T.G., Williams, J.T., Kulbicki, M., Moutham, G., Labrosse, P., Kronen, M., Clua, E. (2004). Check-list of the shore and epipelagic fishes of Tonga. <i>Atoll Research Bulletin</i> , 502:1-35.	0,92

Book chapters

Clua, E. (2018a) Le poisson endémique de l'île de Clipperton-La Passion. In 'La Passion-Clipperton: île sacrifiée' Eds P. Folliot-C. Jost – La Bibliothèque – pp. 84-85 ;196 pp.

Clua, E. (2018b) Clipperton: paradis perdu pour les requins. In 'La Passion-Clipperton: île sacrifiée' Eds P. Folliot-C. Jost – La Bibliothèque – pp. 126-127 ;196 pp.

Reviewer for scientific journals

Journal	Impact factor
<i>Conservation Biology - Wiley</i>	4,35
<i>Estuarine, Coastal and Shelf Science - Elsevier</i>	2,8
<i>Journal of Fish Biology - Wiley</i>	1,83
<i>Environmental Biology of Fishes- Springer</i>	0,91

Main projects (as a framework for publications)

In charge of the fisheries component of the **DemEcoFish project** (2001-2003) implemented by the SPC in Fiji and Tonga in order to between the availability of reef fish resources (fisheries component) and the main anthropogenic factors (demography, fishing pressure) (Socio-economic component). Funding by the McArthur Foundation (200 KUS\$).

Oral presentations in international meetings

Year	Name of congress/Symposia/Workshop
2018	Pacific International University Regional Meeting , réunion générale 20-23 rd October, Papeete, French Polynesia. « Culture as a segmentation vector of the oceanian market of animal-based ecotourism» Clua, E.
2009	International Coral Reef Initiative ICRI General Meeting , réunion générale 20-23 rd April, Phuket, Thailand. « Potential effects of climate change on fish resources in the South Pacific » Clua, E.
2008	International Coral Reef Symposium ICRS–XIth in Fort Lauderdale (USA) from 07 to 11 July. « Combining geography, ecology and socio-economy for sustainable management of coral reef fisheries in the South Pacific » Vigliola, L. Clua, E. <i>et al.</i>
2006	XXIst Pacific Science Congress (PSC21) , 12-18 June, Okinawa, Japan. « Potential indicators of the status of reef fisheries based on the shifting dominance phenomenon among Scarid species submitted to fishing pressure » Clua, E. and Legendre, P.
2004	International Coral Reef Symposium ICRS –Xth in Okinawa (Japan) from 26 juin to 02 July. “Status of Reef and Lagoon Resources in the South Pacific – A Result of Socioeconomic Factors” Kronen, M., Friedman, K., Clua, E. <i>et al.</i>
2003	MARE Symposium , 04-06 September, Amsterdam, Netherlands. « Use and Status of Marine Resources – A Complex System of Dependencies Between Man and Nature: Case Studies from Tonga and Fiji, South Pacific” Mecki Kronen, Eric Clua <i>et al.</i>
2002	PNEC Programme National pour l'Environnement Côtier - Atelier de Nouvelle-Calédonie (Nouméa-Août). « Potential indicators and integrated approach for monitoring and assesment of coral reef fisheries (crf) » Clua, E. <i>et al.</i>
2001	Pacific Head Of Fisheries Meeting - (HOF) (23-27 July) Seretariat of the Pacific Community (Noumea). « Approche halieutique et socio-économique des pêches artisanales récifo-lagonaires dans le Pacifique Sud » Clua, E. and Labrosse, P.

2001	PNEC Programme National pour l'Environnement Côtier - Atelier de Nouvelle-Calédonie (Nouméa-Août). « Mise au point d'indicateurs du niveau d'exploitation des pêcheries récfales en Nouvelle-Calédonie : le cas de la loche saumonée <i>Plectropomus leopardus</i> » Clua, E. and Kulbicki, M.
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Organisation of international meetings

Meeting	Time	Place	Thematic	Nber of part.	Organization of
International Coral Reef Initiative (ICRI)	Jan 2010	Monaco	Acting as the coordinator of the working group on 'Management of reef fisheries'	100	Half-day session
	Nov 2010	Apia (Samoa)		90	
Pacific sciences Inter-Congress (PSI2009)	Mar2009	Papeete (FP)	Access and Benefit sharing linked to Coral Reefs Bioprospection	40	1-day session
Symposium on Capture and Culture of postlarvae (PCC)	Jul 2008	Paris (France)	Development of eco-friendly reef fisheries	50	Whole workshop (1 d)
Pacific sciences Congress (PSC21)	Jun 2007	Okinawa (Japan)	Sustainable management of reef fisheries	30	Half-day session
CRISP Regional meeting	Oct 2007	Townsville (Australia)	Sustainable management of coral reefs	70	Whole workshop (5 d)

Study of ecology and biology of sharks in natural conditions

Overview:

My Specialization in shark studies followed three axis, partly based on different environmental factors influencing the shark ecology:

- i) **The Coral Sea** (western Pacific): a pelagic area encompassing large coral reef systems on the western side (the Great Barrier reef) and the eastern side (the New Caledonian great lagoon) respectively, with large continental islands. I first developed a full research program in partnership with Griffith University (Dr Jonathan Werry, Australia) to study the **biology and spatial connectivity of the tiger shark *Galeocerdo cuvier* and the bull shark *Carcharhinus leucas*** between New Caledonia and the Great Barrier reef (Clua et al. 2013; Werry and Clua 2013; Werry et al. 2014). I also developed links with researchers from New Zealand (Dr Malcolm Francis, NIWA) and Australia (Dr Barry Bruce, CSIRO) focusing on a regional approach (around the Coral Sea) for better assessing the ecology of the **white shark *Carcharodon carcharias*** (Clua and seret 2010).
- ii) **French Polynesia** (Eastern Pacific): a large pelagic area including small islands and limited lagoon, offering a very fragmented environment. I developed a strong collaboration with the UMR8046 CNRS-EPHE regarding the ecology and resilience of coastal sharks such as the **lemon shark *Negaprion acutidens*, and the blacktip shark *Carcharhinus melanopterus*** in the context of anthropogenic pressure such as **artificial provisioning for ecotourism purposes**. We developed a 5-year study focusing on the effects of a daily feeding of a lemon shark population (Buray et al. 2009, Clua et al. 2010a, 2010b) and we used this privileged access to the sharks for a study on the **genetic connectivity and breeding patterns** of this species (Mourier et al. 2013). More recently, I was involved in the work of my colleagues J. Mourier who described new aspects of the functioning of shark schools in the coral reef ecosystems (Mourier et al. 2016).
- iii) **The Indo-Pacific region**: I have been involved in the co-supervision of a PhD student who has completed his PhD in 2014 on the **genetic structure and demographic history of two models** (the whale shark and the blacktip shark). We published together part of his work on genetic connectivity of the blacktip shark in a fragmented environment (Vignaud et al. 2013; Vignaud et al. 2014).

Peer-reviewed publications (my students in bold)

Reference	Impact factor
Sequeira, A.M.M., Rodríguez, J.P., Eguíluz, V.M., Clua, E. et al. (2018) Convergence of movement patterns of marine megafauna in coastal and open oceans. <i>Proceedings of the National Academy of Science</i> , https://doi.org/10.1073/pnas.1716137115	9,6
Mourier, J., Maynard, J., Parravicini, V., Ballesta, L., Clua, E. , Domeier, M., Planes, S. (2016) Extreme inverted trophic pyramid of reef sharks supported by spawning groupers. <i>Current Biology</i> 26, 1–6. http://dx.doi.org/10.1016/j.cub.2016.05.058	10,1
Clua, E. and Vignaud T. (2016) Possible collapse of reef shark populations in remote coral reef ecosystems in the Coral Sea (Western Pacific). <i>Cybium</i> 2016, 40(1): 51-59.	0,5
Vignaud, T. , Mourier, J., Maynard, J., Leblois, R., Spaet, J., Clua, E. , Neglia, V. and Planes, S. (2014) Blacktip reef sharks, <i>Carcharhinus melanopterus</i> , have high genetic structure and varying demographic histories in their Indo-Pacific range. <i>Molecular ecology</i> 23, 5193-5207.	5,8
Werry, J. , Planes, S., Berumen, M., Lee, K. A., Braun, C. D. and Clua E. (2014) Reef fidelity and migration of tiger sharks, <i>Galeocerdo cuvier</i> , across the Coral Sea. Plos ONE 9(1): e83249.	4,09
Werry, J. M. and Clua, E. (2013). Sex-based spatial segregation of adult bull sharks, <i>Carcharhinus leucas</i> , in the New Caledonian great lagoon. <i>Aquatic Living Resources</i> , 26(04), 281-288.	1,23
Mourier J., Buray N., Schultz J. K., Clua E. , Planes S. (2013) Genetic Network and Breeding Patterns of a Sickletfin Lemon Shark (<i>Negaprion acutidens</i>) Population in the Society Islands, French Polynesia. PLoS ONE 8(8): e73899. doi:10.1371/journal.pone.0073899	4,09
Vignaud T. , Clua E. , Mourier J., Maynard J., Planes S. (2013) Microsatellite Analyses of Blacktip Reef Sharks (<i>Carcharhinus melanopterus</i>) in a Fragmented Environment Show Structured Clusters. PLoS ONE 8(4): e61067. doi:10.1371/journal.pone.0061067	4,09
Clua, E. , Read, T. , Chauvet, C., Werry, J. and Shing Y. Lee (2013) Behavioural patterns of a Tiger Shark (<i>Galeocerdo cuvier</i>) feeding aggregation on a whale carcass in Prony bay, New Caledonia. <i>Marine and Freshwater Physiology and Behaviour</i> . DOI:10.1080/10236244.2013.773127	0,68

Book chapter

Clua E., Séret B. (2012) New Caledonia as a potential wintering ground for the white shark (*Carcharodon carcharias*). In : Domeier ML editor. *Global Perspectives on the Biology and Life History of the Great White Shark*, CRC Press, Boca Raton, FL. Pp 341-351.

Reviewer for scientific journals

Journal	Impact factor
<i>Biological conservation - Elsevier</i>	4,03
<i>Marine Ecology Progress Series - Elsevier</i>	2,63

Main projects (as a framework for publications)

- Designer and head of project “**SharKal 2008-2012**” (250 K€) looking at studying connectivity of large sharks throughout the Coral Sea. Co-financed by the Agence Française de Développement (AFD) and the French Pacific Fund (Fonds Pacifique). Partnership with Griffith univ., CSIRO (Australie), NIWA – (Nouvelle-Zélande) and UMR 8046 CNRS-EPHE (French polynesia).
- Designer and head of mission for **two scientific expeditions** in the Chesterfields archipelago (Coral Sea) in July 2010 “**Chester2010**” (12 scientists and 4 thématiques, cf Clua et al. 2011) and in novembre 2011 “**Chester2011**” (5 scientists and 2 thématiques, cf. Clua 2012).
- In charge of implementing the Polynesian fold of the international **Finprint project** (www.globalfinprint.com) looking at defining the driving factors (both natural and anthropogenic) of the shark diversity and abundance.

Clua E., Gardes L., McKenna S., Vieux C. (eds) (2011) Contribution à l’inventaire biologique et à l’évaluation des ressources sur les récifs des Chesterfield = *Contribution to the biological inventory and resource assessment of the Chesterfield reefs*. – Apia, Samoa : SPREP. 264 pp.

Clua E. (2012) Rapport de mission pour le suivi biologique des populations de requins autour des récifs de Bampton et Chesterfield (16 au 28 novembre 2011) – Nouméa, Nouvelle-Calédonie : SPC. 34 pp.

Oral presentations in international meetings

Year	Name of congress/Symposia/Workshop
2010	International White Shark Symposium , 7-10 th February, Honolulu, Hawaii, USA. « Ecology of the Great White Shark, <i>Carcharodon carcharias</i> , in New Caledonia (South Pacific) » Clua E. and B. Séret.
2010	International Coral Reef Initiative General Meeting , 12-15 janvier, Monaco, Monaco. « Needs for conservation of sharks amongst coral reef ecosystems » Clua E.

DOMAIN 3 : ENVIRONMENTAL ECONOMICS OF CORAL REEFS

Overview:

I acquired the theoretical basis of general economics through my graduation from the ESSEC (Ecole Supérieure des Sciences Economiques et Commerciales de Cergy-Pontoise) (1989-1991). I then specialized in environmental economics with a specific training provided in 1998 by CIRAD-Green in Montpellier (Dr Jacques Weber/CIRAD). I was the designer and manager of the "CRISP Economic task force" which focused between 2008 and 2012 on the economics of coral reefs (Laurans&Clua et al. 2013). From 2010, I co-supervised a PhD student who worked on the economic valuation of **ecosystem services provided by coral reefs** in New Caledonia and Vanuatu, and the economic interest provided by small size Marine Protected Areas. He defended his PhD in Barcelona (Spain) in 2013. I currently co-author three papers submitted on the **validation of valuation methods of ecosystem services** and case studies (Pascal et al. subm a and b). I also organized two international workshops (2008 and 2010) on "**economic value of the coral reefs**" (see table here after). Finally, I published a paper on the **economic value of shark** that are involved in ecotourism activities (Clua et al. 2011) and I recently published a paper with my ex-PhD student about the "**Payment for Ecosystem Services**" provided by sharks through ecotourism (Clua and Pascal 2014).

Peer-reviewed publications (my students in bold)

Reference	IF
Pascal, N., Brathwaite, A., Philip, M., Brander, L., Seidl, A. & Clua, E. (2018). Evidence of economic benefits for public investment in MPAs. <i>Ecosystem Services</i> , 30: 3–13. 10.1016/j.ecoser.2017.10.017	4,3
Pascal, N., Allenbach, M., Brathwaite, A., Burke, L., Le Port, G., & Clua, E. (2016). Economic valuation of coral reef ecosystem service of coastal protection: A pragmatic approach. <i>Ecosystem Services</i> , 21, 72-80.	4,3
Pascal, N., Méral, P., Seidl, A. and Clua, E. (Final revision, submitted b) Financial Returns Of Investment based on improved values of Ecosystem Services demonstrate the economic attractiveness of coral reef MPAs. <i>Mar. Ecol. Prog. Ser.</i>	2,63
Clua, E., Pascal, N. (2014) Shark-based ecotourism in the South Pacific : toward the Payment for Ecosystem Services ? <i>SPC Fisheries Bulletin</i> . 144, 30-34.	-
Laurans, Y., Pascal, N., Binet, T., Brander, L., David, G., Rojat, D., Seidl, A. and Clua, E. (2013) Economic valuation of ecosystem services from coral reefs in the South Pacific: taking stock of recent experience. <i>Journal of Environmental Management</i> . 116 :135-144.	3,16
Clua, E., Buray, N., Legendre, P., Mourier, J. and Planes, S. (2011) Business partner or simple catch ? The economic value of the sicklefin lemon shark in French Polynesia. <i>Marine and Freshwater Research</i> . 62 : 764-770.	1,48

Reviewer for scientific journals

Journal	Impact factor
<i>Journal of Environmental Management - Elsevier</i>	3,16

Oral presentations in international meetings

Year	Name of congress/Symposia/Workshop
2013	3rd International Marine Protected Area Congress (IMPAC3) , July 2013, Marseille, France. "Private financing for MPAs : concrete experiences." Pascal, N., Clua, E. et al.
2012	12th International Coral Reef Symposium (ICRS) , Cairns, Australia, 9-13 July "What impacts to expect from economic valuation of coral reefs?". Pascal, N., Clua, E. et al.

2010	International Institute of Fisheries Economics & Trade (IIFET) , July 13- 16, Montpellier, France. “MPAs: good for fish, good for people? Cost-benefit analysis of Community based marine managed areas: 5 case studies in Vanuatu (South Pacific)” Pascal, N., Clua, E. et al.
2009	2nd International Marine Protected Areas Congress (IMPAC2) , Washington, USA. « Culture and updated traditional management tools for serving ownership in locally managed marine areas of the South Pacific » Clua, E.
2006	Symposium GECOREV , 26-28 June, Saint-Quentin en Yvelines, France. « Toward a « cultural» management of natural environments in Oceania ? » E. Clua and J.-B. Herrenschildt

Organisation of international meetings

Meeting	Year	Place	Thematic	Nber of part.	Organization of
CRISP Economic Task Force workshop	May 2008	Suva (Fiji)	Coral reefs economics	30	full workshop (5 d)
	Nov 2010	Noumea (NC)		20	full workshop (4 d)

OTHER DOMAINS : physiology of human free-diving and marine mammalogy

Overview:

I maintain scientific collaborations since 2000 with Dr Claire Garrigue in New Caledonia (Operation cétacés association) for the study of cetaceans (Clua and grosvalet 2001; Clua et al. in press), and with Dr Frédéric Lemaître (University of Rouen) in human free-diving physiology (Lemaître et al. 2010), respectively.

Peer-reviewed publications

Reference	IF
Costalat, G., Coquart, C., Castres, I., Joulia, F., Sirost, O., Clua, E. , Lemaître, F. (2016) The oxygen-conserving potential of the diving response: a kinetic-based analysis. <i>J of Sport Sciences</i> . DOI:10.1080/02640414.2016.1183809	2,25
Clua, E. , Manire, C. and C. Garrigue (2014) Biological data of pygmy killer whale (<i>Feresa attenuata</i>) from a mass stranding in New Caledonia (South Pacific) associated with 2006 Hurricane Jim. <i>Marine Mammals</i> , 40(2), 162-172, DOI 10.1578/AM.40.2.2014.162	0,7
Lemaître, F., Clua, E. , Andreani, B., Castres, I. and Chollet, D. (2010) Ventilatory function in breath-hold divers: effect of glossopharyngeal insufflation. <i>Eur J Appl Physiol</i> 108:741–747.	1,91
Clua, E. , Grosvalet, F. (2001).- Mixed-species feeding aggregation of cetaceans, large tunas and seabirds in the Azores, <i>Aquatic Living Ressources</i> , Vol. 14, N°1, pp : 11-18.	1,23

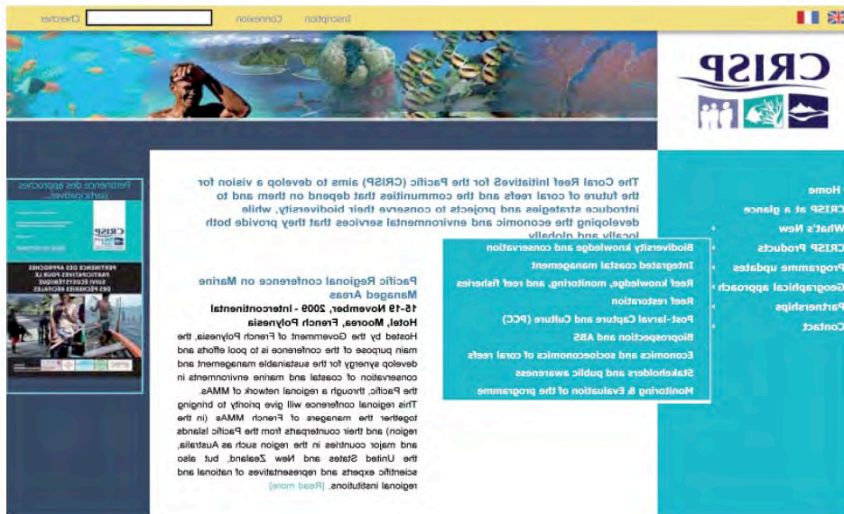
Book chapters

- Clua, E.** (2015). L’entraînement à l’apnée : approche pratique. In « L’apnée : De la théorie à la pratique ». Ed. Presses Universitaires de Rouen et du Havre. 2^{ème} édition. Chap. 2: 327-376.
- Clua, E.**, Auplat, E. et F. Villien (2015). Contribution du yoga pour l’entraînement à l’apnée. In « L’apnée : De la théorie à la pratique ». Ed. Presses Universitaires de Rouen et du Havre. 2^{ème} édition. Chap.3: 377-426.
- Clua, E.** (2007). L’entraînement à l’apnée : approche pratique. In « L’apnée : De la théorie à la pratique ». Ed. Presses Universitaires de Rouen et du Havre. Chap. III-2: 329-372.
- Clua, E.**, Auplat, E. et F. Villien (2007). Contribution du yoga pour l’entraînement à l’apnée. In « L’apnée : De la théorie à la pratique ». Ed. Presses Universitaires de Rouen et du Havre. Chap. III-3: 373-411.

Oral presentations in international meetings

Année	Name of congress/Symposia/Workshop
2003	International Whale Commission . “Identification of a juvenile pygmy blue whale (<i>Balaenoptera musculus breviceauda</i>) in New Caledonia, South-West Pacific”. <i>IWC55/SC/LA</i> Garrigue, C. and Clua, E.
2000	Semana Dos Pescas Dos Acores – XIXème Colloque sur les pêches à Horta (Açores-Portugal) 26-31 March. « Interactions à but alimentaire entre cétacés, oiseaux et grands thonidés dans les eaux des Açores (Portugal) » Clua, E.

Web sites and access to technical information



Setting up and maintenance of a dedicated **internet website** promoting the results and outputs of an International programme, receiving > 1000 monthly connections between 2006 and 2012, in particular for the downloading of > 800 PDF documents dealing with the sustainable development of coral reefs in the Pacific.

Three years after the project closure, this website is still operating with a search engine (see www.ircp pf/CRISP)

Setting up of a **communication charter** for the CRISP programme.

Editing and formatting of > **800 technical reports and scientific publications**, between 2005 and 2011.



Awards as a film maker

- 2013 - Title: **"Plasticus"** – Humorous SciFi short movie dealing with the conservation of coral reef lagoons. Duration 5' – Funding: DAGSIT Prod – French version – 'Prix special du jury' at the [International Underwater Film Festival in Marseille 2013 \(FRANCE\)](#). Category: independent film makers.

See: <https://www.youtube.com/watch?v=9vCry0dtZPw>

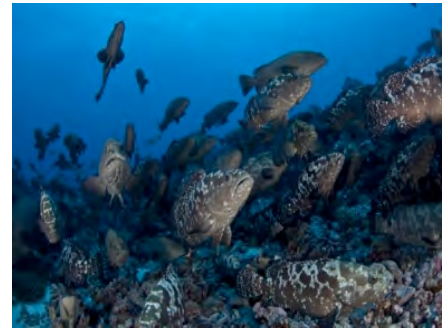
- 2002 - Title: **"Breathless – The Prony blue whale story"** Festival movie showing the death and scavenging of a blue whale in New Caledonia - Duration: 20' – Funding: Dagsit Production – 'Palme d'or' At [The International Underwater Film Festival In Antibes 2002 \(France\)](#). Category: independent film makers. Target: TV public.

See: <https://www.youtube.com/watch?v=aeM0dDzKm9c>



Other main experience as a film maker

- 2012 – Title: **“Spawning for survival”** – TV documentary about a scientific expedition in Tuamotu archipelago looking at studying the shark predation on spawning aggregation of groupers. Duration 52’ – Funding: Cinemarine – French/English versions - Target: TV public.
- 2011 – Title: **“Secrets of the Chesterfield reefs”** – TV documentary about a scientific expedition to remote islands including shark tagging, coral and bird surveys, etc. Duration 52’ – Funding: German TV (ZDF for ARTE) – French/English versions - Target: TV public.
- 2003 - Title: **“PROCFish project: in search of data for better management of reef resources”** – Institutional movie for addressing the issue of reef fisheries management - Duration: 13’ – Funding: SPC/UE – Target: stakeholders of the Pacific islands.



Experience as a cameraman and scientific advisor

- 2009 - Title: **“An Ocean, tens of islands and Polynesian people”** – TV documentary on traditional life and cultural links with the ocean in french Polynesia - Duration: 52’ - Funding: Merapi Production & RFO – Target: TV public.
- 2003 - Title: **“Scavengers of the sea”** –TV documentary on shark biology - Duration: 52’ – 50% of underwater images - Funding: Saint Thomas Production & CANAL+ & Discovery channel – Target: TV public. See: <http://www.saint-thomas.net/home.htm>

OTHER QUALIFICATIONS

SCUBA DIVING	- Professional diver class IB. Licence N°INNP 100/00. 40 years expérience. >800 hours U/W - Level III CMAS and PADI dive master. Nitrox certified. 500 hours U/W - Professional underwater video cameraman. 12-year experience
FREE DIVING	- Skilled free diver. 40 years experience - CMAS instructor and National Federal Instructor of free diving - In charge of the training program of French federal free diving instructors
UNDER-WATER PHOTOGRAPHY	- Skilled underwater photographer. 32-year experience. - Gold award (2002) for the best photo-article at the « World Underwater Image Festival » in Antibes (France). Winner of the 2nd (1995) and 3rd (1994) awards in the same competition. - Author of an article about the death of a blue whale in New Caledonia included in the ‘World Cetacean Manual’ (2003) by H. Debelius (Ed) . Collection IKAN. - Author of 20 articles in APNEA magazine. - Author of a manual on ‘The modern spearfishing’ (2001) AMPHORA Editions. 365 pp. - Author of the 2 nd édition of this same manual in 2014. 450 pp (see cover hereby). 
AVIATION	- Private flying license . Qualification B. 200 hours - Qualified for aeroplane birds survey. 50 hours
RUGBY	- French National Top Rugby Union player for 6 years (Colomiers, Paris Université Club). - Captain for 5 rugby tours in Australia, South Africa, South America (2) and Canada.