

Eric CLUA

Born on the 16 July 1964 in France
50 years. In couple with 2 children



Coral reefs ecologist
Environmental economist
Eco-anthropologist

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Short profile

Academic profile and fields of expertise

- Academic titles**
- Qualified for a position of **'Professor of University'** (CNU, 2014)
 - Qualified as 'PhD supervisor' (**HDR**) (University of Perpignan, 2013)
 - **PhD with honors** (Ecole Pratique des Hautes Etudes, 2004)
 - Master degree (Ecole Pratique des Hautes Etudes, 2000)
 - Graduated from the **'Ecole Supérieure des Sciences Economiques et Commerciales'** (ESSEC, 1991)
 - Graduated as **Doctor of Veterinary Medicine** (Toulouse, 1989)
- Languages** French (native), Spanish (native) and **English** (very fluent)
- Transdisciplinarity expertise**
- Marine ecology with a focus on **coral reef ecosystems**
 - Environmental economics with a focus on **marine ecosystem services**
 - Eco-anthropology with a focus on **Oceania**
- Fields of research**
- **Marine ecology** / Behavioural ecology / Ichthyology / **Sharks** / Spatial connectivity / Tools for sustainable development of biodiversity
 - **Environmental economics** / Ecosystem Services / Payment for Ecosystem Services
 - **Eco-anthropology** / Human-shark interactions / Risk perception and management
- Specific expertises**
- Setting up, **implementation** and monitoring&evaluation of **projects**
 - International, institutional, technical and political **networking**
 - Coordination and **management of teams** and people
 - **Training and capacity building** of people and teams
 - **Communication**&sensitization of scientific topics
- Personal skills**
- **Professional diver** Class 1B / National Instructor for Free-diving / Skilled underwater photographer / Underwater video cameraman
 - **Film-maker** and **e-learning specialist**
 - Expert in Forensic and legal Medicine (Shark attacks)
- Indicators of performance**
- Fund raising**
- Average of **1.5 M€ raised per year** (for the past 10 years)
- Fund management**
- Average of **1 M€ to manage per year** (for the past 10 years)
- Training of students**
- 3 postdoc ; 4 PhD (as co-supervisor) ; 4 Master2 ; 1 EPHE diplôme ; 4 Master1
- International conferences and courses**
- Average of **3 oral presentations per year** between 2006 and 2014
 - Responsible for the **full organization of 3 international workshops** (>120 people)
 - Organization of a full session amongst 3 international symposia (>50 presentations)
 - **10 hours of courses (2014) for Master1 and 2 students** on Coral Reefs ecology
- Peer-reviewed publications**
- Total of **30 publications in < 10 years** (since PhD), including 14 with students
 - Average of **3.8 publications per year** (for the past 5 years ; **average IF of 2.02**)
 - Peer-reviewed publications as **first author in at least 5 different fields of expertise**
 - **Reviewer for 3 Journals with IF > 2.6**

ACADEMIC TRAINING : Biological/Ecological Sciences and Economics

February 2014	Qualified by the National University Board for an application as « Professor of University ». Section 67 – Biology of populations and ecology. N° 14167264623
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.
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 ichthyo-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 ichthyoecology ». 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 1993	Recruitment as civil servant of the Ministry of Agriculture and Fisheries
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 médecine 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.

LANGUAGES : Trilingual

French	Native language
Spanish	Second native language
English	12 professional years in 100% English-speaking environment

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).

PROFESSIONAL EXPERIENCE

Duration :	3 years	Period :	sept 2012 to sept 2015
Position :	Scientific advisor of the High Commissioner of the French Republic ('DRRT')		
Location:	Papeete (French Polynesia)		
Contractor:	Ministry of Post-graduate Education and Research		
Status:	A+ french civil servant		
Duty:	Implement in French Polynesia the policy of 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 for the development of web-based education programmes in French Polynesia; 5) Support to the development of a scientific culture 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 :

- 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 (provided by 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 special commission of the ICRI (*International Coral Reef Initiative*) in charge of the 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 : 1,5 years Period : Jan 2004 to March 2015

Position : **Scientific advisor for an international programme setting up**

Location: Paris (France)

Contractor: Agence Française de Développement – Division « environnement »

Status: A+ french civil servant

Duty: Set up an international programme on sustainable development of coral reefs

Job description :

- 1) **Evaluation of proposals** from candidate organizations, definition and rationalisation of actions and components;
- 2) **Fund allocation and fund raising** with financial partners, negotiation of funding agreements with technical partners;
- 3) Preparation of the reports to be submitted to AFD and French GEF boards for approval;
- 4) **Definition of indicators** for multilevel monitoring, management, arrangements and procedures of the project, preparation of the launching of the project;
- 5) **Coordination** with French, foreign and international institutional partners*.

*French GEF, Ministry of foreign Affairs, Ministry of Ecology and Sustainable Development, French Overseas territories, United Nations Foundation, International Coral Reef Action Network, Conservation International, World Wide Fund for Nature, Secretariat of the Pacific Community, South Pacific Regional Environmental Program, United Nations Environmental Program, World Heritage UNESCO, CNRS, IRD, CIRAD, EPHE, University of South Pacific, private firms

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 description:	<ul style="list-style-type: none"> • Data analysis ; discussion of results • 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 description:	<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 project (Programme National de l'Environnement Côtier) in New Caledonia: identification and validation of indicators of fishing pressure in reef fisheries. 		

Duration	1,5 years	Period:	Sep 1999 to Feb 2001
Position :	Project manager		
Location:	Paris (France)		
Contractor:	Ministry of Agriculture and Fisheries		
Duty:	In charge of the development of computer support to the central public veterinary administration and involvement in the International Sanitary and Cooperation Unit (MCSI) at the French Food and Drug Administration (DGAL)		
Job description:	<ul style="list-style-type: none"> ▪ 50% individual and collective training of the central veterinary staff, installation of PCs, improvement of a database for human resources ▪ 50% MCSI : participation to international negotiations for export sanitary agreements. 		

Duration	3.5 years	Period:	March 1996 to Sep 1999
Position :	Technical advisor and head of project at the Ministry of Livestock		
Location:	Islamic Republic of Mauritania (Western Africa)		
Contractor :	French Ministry of Foreign Affairs		
Job description:	<ul style="list-style-type: none"> • In charge of a FAC (Fonds D'Aide à la Cooperation) of 500 KUS\$ to promote an integrated approach of extensive livestock and terrestrial biodiversity conservation in the Sahelian area (zoning for grazing activities and No Take Zones, re-introduction of Guinea fowls, water resources management, etc.), and ii) an epidemiology network for animal disease in order to facilitate the livestock trading. • In charge of supporting the Mauritanian public policies and financing of agriculture and livestock development through the negociations with international funding agencies such as the Banque Africaine de Développement (BAD), the European Union (EU) or the World Bank. 		

Duration	0,7 years	Period:	Aug 1995 to Mar 1996
Position :	Project manager		
Location:	Paris (France)		
Contractor:	Ministry of Agriculture and Fisheries		
Duty:	Design of a database system for an optimized human resources management plan		
Job description:	Choice of computer program, database formatting, data processing, training of users		

Duration	4 years	Period:	Decembre 1991 to August 1995
Position :	Technical advisor and head of project at the Ministry of Fisheries and Agriculture		
Location:	Commonwealth of Dominica (West Indies)		
Contractor :	French Ministry for Cooperation		
Duty:	Head of a livestock development project and advisor of the Director of Fisheries department		
Job description:	<ul style="list-style-type: none"> • Design and implementation of the 'Scott's Head and Soufriere Marine Reserve Project' funded by the French GEF (200 KUS\$) to promote biodiversity conservation and sustainable use of marine resources, through protection, management and scientific monitoring of coral reefs; the implementation of a marine reserve (No Take Zoning, setting up of a management system, public awareness campaigns seeking the commitment of local communities); diversification and support to fishing activities; and development of on-land and submarine tourist activities. • Implementation of a project (500 KUS\$) of 'Genetic improvement of the local Saddle back pig breed' for boosting the local production and decrease the importation of pig meat. 		

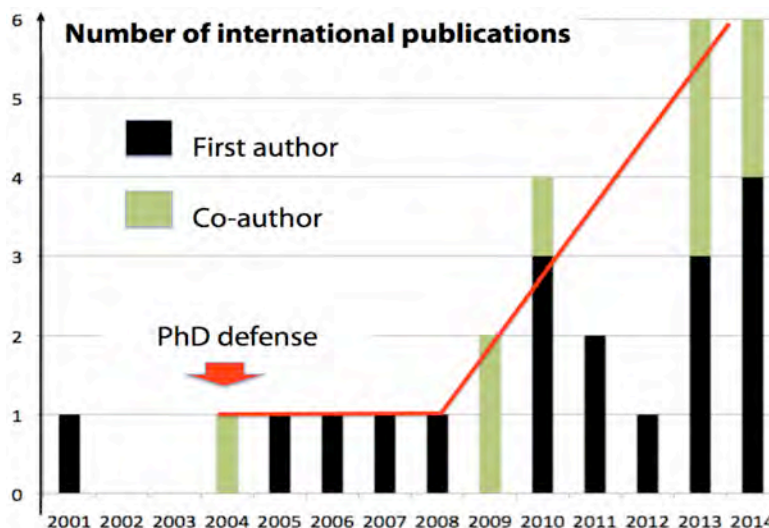
Duration	0,3 years	Period:	Apr 1990 to Jul 1990
Position :	Junior and senior consultant		
Location:	Paris (France)		
Contractor :	Ernst&Young Consulting		
Job description:	<ul style="list-style-type: none"> • Study of the French Biotechnologies market : Publication of a survey : P. Anhoury and E. Clua "Survey on Biotec's in France in 1990", 1990, Elsevier, 200 p. • Strategic audit of the public veterinary medical analysis laboratory in Nice (South East of France) : As a senior consultant: market analysis, definition of the main strategic options and implementation of adaptive measures. 		

Duration	2 (cumulated) years	Period:	1987 to 1991
Position :	Practice of veterinary Medicine		
Location:	South-west and central France		
Contractor :	Veterinary clinics		
Job description:	Mixed activity in rural clinics (pets and livestock)		

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). 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 present 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 5 years) of 3.8 peer-reviewed publications per year (with an average impact factor of 2.03)

DOMAIN 1 : ECOLOGY AND BIOLOGY OF CORAL REEF FISHES

Preliminary background: tropical ichthyo-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 ichthyo-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) 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
<u>Clua, E.</u> , Chauvet, C., Mourier, J., Werry, J. M. and Randall, J. E. (Submitted) Pattern of Movements from a home reef in the Chesterfield Islands (Coral sea) by the Giant Grouper, <i>Epinephelus lanceolatus</i> . <i>Coral Reefs</i> .	3,6
<u>Clua, E.</u> , 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., <u>E. Clua</u> , 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
<u>Clua, E.</u> 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
<u>Clua, E.</u> (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) : 38.	0,5
<u>Clua, E.</u> , 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
<u>Clua, E.</u> , 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., <u>Clua, E.</u> (2004). Check-list of the shore and epipelagic fishes of Tonga. <i>Atoll Research Bulletin</i> , 502:1-35.	0,92

Reviewer for scientific journals

Journal	Impact factor
<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
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 » <u>Clua, E.</u>
2008	International Coral Reef Symposium ICRS–XI th 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. <u>Clua, E.</u> et al.

2006	<i>XXIst Pacific Science Congress (PSC21)</i> , 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 » <u>Clua, E.</u> and Legendre, P.
2004	<i>International Coral Reef Symposium ICRS –Xth</i> 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., <u>Clua, E.</u> <i>et al.</i>
2003	<i>MARE Symposium</i> , 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, <u>Eric Clua</u> <i>et al.</i>
2002	<i>PNEC Programme National pour l’Environnement Côtier - Atelier de Nouvelle-Calédonie (Nouméa-Août)</i> . « Potential indicators and integrated approach for monitoring and assesment of coral reef fisheries (crf) » <u>Clua, E.</u> <i>et al.</i>
2001	<i>Pacific Head Of Fisheries Meeting - (HOF)</i> (23-27 July) Seretariat of the Pacific Community (Noumea). « Approche halieutique et socio-économique des pêches artisanales récifo-lagonaires dans le Pacifique Sud » <u>Clua, E.</u> and Labrosse, P.
2001	<i>PNEC Programme National pour l’Environnement Côtier - Atelier de Nouvelle-Calédonie (Nouméa-Août)</i> . « 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> » <u>Clua, E.</u> and Kulbicki, M.

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)	Mar20 09	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).

- 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
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. doi:10.1371/journal.pone.0083249	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 Sicklefin 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>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).

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) » <u>Clua E.</u> and B. Séret.
2010	International Coral Reef Initiative General Meeting , 12-15 janvier, Monaco, Monaco. « Needs for conservation of sharks amongst coral reef ecosystems » <u>Clua E.</u>

DOMAIN 2 : 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. , Allenbach, M. and <u>Clua, E.</u> (Final revision, submitted a) Cost-Benefit Analysis applied to support of ecosystem services provided by Coral Reefs and Mangroves: A Review of the Literature. <i>International Journal of Biodiversity Science, Ecosystem Services & Management</i>	1,2
Pascal, N. , Méral, P., Seidl, A. and <u>Clua, E.</u> (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
<u>Clua, E.</u> , 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 <u>Clua, E.</u> (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
<u>Clua, E.</u> , 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</i> - Elsevier	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. , <u>Clua, E.</u> 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. , <u>Clua, E.</u> 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. , <u>Clua, E.</u> 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 » <u>Clua, E.</u>
2006	Symposium GECOREV , 26-28 June, Saint-Quentin en Yvelines, France. « Toward a « cultural » management of natural environments in Oceania ? » <u>E. Clua</u> 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)

DOMAIN 3 : ECO-ANTHROPOLOGY OF SHARK-HUMAN INTERACTIONS

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).

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 three peer-reviewed articles and three expert reports on the subject of fatal attacks on humans. I recently published an article about the management of accidental bites in the context of shark-feeding.

Peer-reviewed publications (my students in bold)

Reference	IF
<u>Clua, E.</u> and Guiart, J. (Submitted) Why Kanak Do Not Fear Sharks ? Myths as a Mirror for a Coherent as well as Dangerous Nature. <i>Oceania</i> .	0,4
<u>Clua, E.</u> (Submitted) Managing bite risk for divers during shark feeding ecotourism: a case study from French Polynesia. <i>Tourism management</i>	2,6
<u>Clua, E.</u> , Galves, J. B., and Werry, J. M. (2014) Insight into cumulative intra-guild and intra-specific depredation among sharks. <i>Cybium 38(4): 311-313</i> .	0,5
<u>Clua, E.</u> , 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
<u>Clua, E.</u> 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
<u>Clua, E.</u> , 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
<u>Clua, E.</u> , 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
<u>Clua, E.</u> 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 <u>Clua, E.</u> (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. and Guiart, J. (*In press*) 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
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 ? » <u>Clua E.</u>
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 » <u>Clua E. et al.</u>
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 » <u>Clua E. et al.</u>

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 cétaqués association) for the study of cetaceans (Clua and grosvalet 2001; Clua et al. in press), and with Dr Frédéric Lemaitre (University of Rouen) in human free-diving physiology (Lemaitre et al. 2010), respectively.

Peer-reviewed publications

Reference	Impact factor
<u>Clua, E.,</u> 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
Lemaitre, F., <u>Clua, E.</u> , 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
<u>Clua, E.,</u> 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

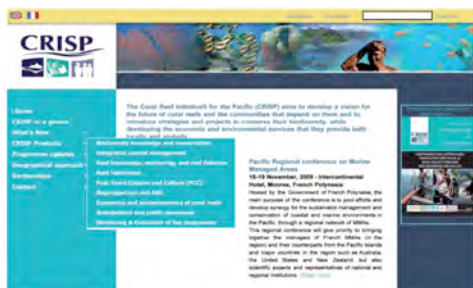
- Clua, E. (2015). L'entraînement à l'apnée : approche pratique. In « L'apnée : De la théorie à la pratique ». Ed. Presses Universitaires de Rouen et du Havre. 2^{ème} édition. Chap. 2: 327-376.
- Clua, E., Auplat, E. et F. Villien (2015). Contribution du yoga pour l'entraînement à l'apnée. In « L'apnée : 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 brevicauda</i>) in New Caledonia, South-West Pacific”. <i>IWC55/SC/IA</i> Garrigue, C. and <u>Clua, E.</u>
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) » <u>Clua, E.</u>

EXPERTISE IN COMMUNICATION AND SENSITIZATION

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.



Plus de 110 documents sont disponibles sur www.crisonline.net.

Experience 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.
- 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: DAGSIT Prod – 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.
- 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.



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	<ul style="list-style-type: none"> - Professional diver class IB. Licence N°INNP 100/00. 40 years expérience. 500 hours U/W - Level III CMAS and PADI dive master. 500 hours U/W - Professional underwater video cameraman. 8-year experience
FREE DIVING	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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 'La Chasse sous-marine moderne' (2001) AMPHORA Editions. 365 pp. - Author of the 2nd édition of this same manuel in 2014. 450 pp (see cover hereby). 
AVIATION	<ul style="list-style-type: none"> - Private flying license. Qualification B. 200 hours - Qualified for aeroplane birds survey. 50 hours
RUGBY	<ul style="list-style-type: none"> - 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.