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## Curriculum Vitae

### Research Interests

- I have conducted research within the general area of vertebrate foraging ecology, with particular interest in relationships between behaviour, physiology, and environmental variability. I'm keenly interested in understanding the mechanisms affecting variation in habitat quality at various scales of biological organization, as well as finding ways to quantify such processes. Ultimately, I hope that these efforts will help provide sound criteria for preserving habitat which is critical for ecosystem health.

### Professional Experience

#### *University of Manitoba (Department of Biological Sciences)*

- Postdoctoral Research Fellow
- April 2010 - present. Winnipeg, Manitoba, Canada.
  - Polar bear - ringed seal ecology in Hudson Bay investigating predator - prey relationships under climate change.

#### *Environmental Sciences Group (Royal Military College of Canada)*

- Research Assistant
- May 2008 - November 2009. Winnipeg, Manitoba, Canada.
  - Leader for project to study ringed seal foraging behaviour and habitat selection in Saglek Bay, Labrador, in collaboration with Fisheries and Oceans, Atlantic Region. The project focuses on assessment of impacts of historic contamination on the ecology of ringed seals.

#### *Fisheries and Oceans Canada*

- Research Assistant
- April 2008 - March 2010. Winnipeg, Manitoba, Canada.
  - Continuing development of project to study ringed seal foraging behaviour and habitat selection in Hudson Bay.
  - Identification of critical marine mammal foraging habitat, through state-space models of movement and diving behaviour.

- Research Assistant
- February 2008. Winnipeg, Manitoba, Canada.
  - Geospatial analysis of Beaufort Sea beluga movements. Estimation of beluga movement tracks and behavioural modes through state-space models to determine most likely foraging areas.

- Research Assistant
- November 2007 - February 2008. Winnipeg, Manitoba, Canada.
  - Geospatial analysis of ringed seal movement behaviour and development of computer program to use state-space models of animal movement in Hudson Bay.

- Research Assistant
- May - September 2007. Winnipeg, Manitoba, Canada.

## Professional Experience (continued)

- Organization of Field research activities and analysis of ringed seal diving and movement behaviour in Hudson Bay.
- Research Assistant
- November 2006 - March 2007. Winnipeg, Manitoba, Canada.
  - Determine what effects, if any, regime shifts in the eastern Bering and Chukchi Seas have had on beluga populations.

- Research Assistant
- September 2005 - March 2006. Winnipeg, Manitoba, Canada.
  - Analysis of age structure, growth, and survival of beluga in the Beaufort Sea, and comparison of all Canadian beluga populations. This work included a redesign and organization of the age and morphometry database, spanning 25 years.

### *Memorial University*

- Laboratory Assistant
- September - December 2003. St. John's, Newfoundland, Canada.
  - Assisted in the instruction of the laboratory section of the Biology course for undergraduate students.

- Laboratory Assistant
- January - August 2001. St. John's, Newfoundland, Canada.
  - Assisted in the instruction of the laboratory section of the Evolution course for undergraduate students.

### *Universidad Autónoma de Baja California Sur*

- Statistics Instructor
- June - August 2000. La Paz, Baja California Sur, Mexico.
  - Undergraduate Statistics instructor for 35 Senior Biology students in the largest University of the State. Summer Term.

### *Instituto Politécnico Nacional*

- Research Assistant
- January - May 2000. La Paz, Baja California Sur, Mexico.
  - Design and construction of a database including information on the fish assemblages found in Cerralvo island and the adjacent Baja California peninsula region.

### *Elderhostel*

- Marine Ecology Lecturer
- December 1999 - February 2000. La Paz, Baja California Sur, Mexico.
  - Marine Ecology of the Gulf of California for groups of 25-30 people. Naturalist guide on field trips to the bay of La Paz and Bahía Magdalena.

### *Instituto Politécnico Nacional*

- Research Expedition Leader
- June - August 1997 and 1998. La Paz, Baja California Sur, Mexico.

## Professional Experience (continued)

- Design and organization of two California sea lion research expeditions to the Gulf of California to collect data for the assessment of the health status of the sea lion population. The expeditions were supported by Mexican Navy ships, and responsibilities included the coordination of Navy personnel activities with research operations of eight onboard researchers. The success of both expeditions resulted in the publication of several scientific papers on peer-reviewed journals and graduate theses.
- Design of equipment suitable for pinniped research in the field, including portable tables, benches, and animal enclosures and measuring devices.

### *North Pacific Universities Marine Mammal Consortium*

Research Assistant

- July - December 1995. Vancouver, BC, Canada.
- Responsible for overseeing stomach temperature experiments conducted on adult female Steller sea lions at the Vancouver Aquarium. These experiments were part of the effort by the Consortium to understand the decline in sea lion abundance in Western Alaska.

### *Rain Forest Information Center*

Field Assistant

- October - December 1991. Quito, Ecuador.
- Assistance in data collection while in the field for mammalogists, ornithologists, and entomologists.
- Construction of border paths, miscellaneous carpentry and maintenance duties at Los Cedros Ecological Reserve in the Western Cloudy Forest of Ecuador.
- Construction of two forest canopy platforms for ornithological studies.

### *New York Zoological Society*

Field Assistant

- October - December 1991. Puerto Madryn, Argentina.
- Maintenance of the Society's camp "39" facilities in Golfo San José, Peninsula Valdés, Argentina.
- Responsible for bringing support from sea to a team of film makers on Ultralight aircraft, during the production of Discovery Channel's "In the Company of Whales", hosted by Dr. Roger Payne.

### *Patagonian Fishing Industry*

Professional Diver

- August 1988 - August 1991. Puerto Madryn, Argentina.
- Search and collection of bivalves in Golfo San José and Golfo Nuevo, Peninsula Valdés, Argentina.

## Education

### *Memorial University*

- Ph.D.     • 2001 - 2009. St. John's, Newfoundland, Canada.  
          • Biology.

## Education (continued)

- Research focused on interspecific variation of maternal foraging behaviour and its influence on pup development in sympatric Antarctic and Subantarctic fur seals; two similar species with widely differing lactation lengths.
- Aspects studied were lactating female morphometry, diving behaviour, at-sea movements, and diet, on the one hand; and pup morphometry, growth, body composition, and development of diving behaviour, on the other. This project was carried out in the Crozet Archipelago, Southern Indian Ocean, and was codirected by Drs. Christophe Guinet (Centre d'Etudes Biologiques de Chizé, France) and Edward Miller (Memorial University).

### *Instituto Politécnico Nacional*

- M.Sc.
- 1996 - 1999. La Paz, Baja California Sur, Mexico.
  - Management of Marine Resources.
  - Graduated *Cum Laude* investigating sexual and intercolony variation in the nutritional condition of California sea lion pups, as a function of population diet and oceanographic conditions. The study took place in the Gulf of California, and was directed by Dr. David Aurióles-Gamboa (Instituto Politécnico Nacional).
  - The results from the research were presented at the International Meeting for the Study of Marine Mammals, in 1997 and 1999. Two scientific papers have been published in international peer-reviewed journals, based on these data.
  - Assisted in the organization and participated in the Conservation, Assessment, and Management Plan for Mexican Pinnipeds Workshop, and the concurrent Population Viability and Sea Lion Habitat Analysis Workshop, held in La Paz, 9 - 13 February 1998, under the direction of the Conservation Breeding Specialist Group (CBSG). Partially responsible, as an Editor, for the final document which resulted from these workshops (available from CBSG).

### *Southern Utah University*

- B.Sc.
- 1993 - 1995. Cedar City, Utah, U.S.A.
  - Zoology/Chemistry.
  - Senior project review paper: marine mammal diving adaptations.

## Awards and Fellowships

- 2001 - 2004
- Ph.D. student fellowship from the Department of Biology, Memorial University, Canada.
- 2001 - 2005
- Draney - Anderson Fund grant in support of Ph.D. research, California, U.S.A.
- 1996 - 1998
- M.Sc. student fellowship from Instituto Politécnico Nacional, Mexico.
- 1999
- Best Graduate Student Oral Presentation Award at the XXIV International Meeting for the Study of Marine Mammals in Mazatlán, Mexico, April 18 - 22, 1999.

## Skills and Qualifications

### *Computer abilities*

- Extensive experience in the following general purpose software, on GNU/Linux, MacIntosh, and PC processors: OpenOffice.org, Microsoft Office, and Corel Office Suite. Efficient use of GNU/Linux systems, Microsoft Windows, and MacIntosh operating systems.
- Extensive experience in the following statistical and data management software: GNU R, Systat, Statsoft Statistica, Microsoft Access.
- Proficient in database design, implementation, and management using PostgreSQL, MySQL, and Microsoft Access, as well as their interfaces with statistical and GIS software.
- Proficient use of Emacs and ESS (Emacs Speaks Statistics) as an interface to the GNU R language. Member of the ESS-Core development team.
- Author and maintainer of R package `diveMove` for the analysis of dive behaviour, contributed software to the Free/Open Source Software community (<http://probability.ca/cran/src/contrib/Descriptions/diveMove.html>). Active contributor to this community through software for GNU R and Emacs environments.
- Proficient with Geographical Information Systems (GIS) software: Generic Mapping Tools (GMT) and ArcView, GRASS and associated interfaces with the GNU R analytical tools.
- Proficient with text processing and typesetting software: Emacs, L<sup>A</sup>T<sub>E</sub>X, AUC<sub>T</sub>E<sub>X</sub>, and base GNU/Linux tools. Proficient with BASH (Bourne Again Shell) programming language, and AWK text processing.

### *Field research techniques*

- Extensive experience in the use and analysis of Time - Depth recorders (TDRs) and Platform Transmitter Terminals (PTTs) for satellite tracking and data logging of marine animals.
- Experience with GPS instruments.
- Experience designing equipment and materials for ecological research under harsh conditions.

## Languages

- Spanish
- English
- French

## Publications

- 2011 • Pomerleau C, Patterson TA, **Luque SP**, Lesage V, Heide Jørgensen MP, Dueck LL, Ferguson SH. Bowhead whale (*Balaena mysticetus*) diving and movement patterns in the Eastern Canadian Arctic: Implications for foraging ecology. *Endangered Species Research* 15:167-177.

## Publications (continued)

- 2011 • Matthews CJD, **Luque SP**, Petersen SD, Andrews RD, Ferguson SH. Satellite tracking of a killer whale (*Orcinus orca*) in the eastern Canadian Arctic documents ice avoidance and rapid, long-distance movement into the North Atlantic. *Polar Biology* 34:1091-1096.
- 2011 • **Luque SP**, Fried R. Recursive filtering for zero offset correction of diving depth time series with GNU R package `diveMove`. *PLoS ONE* 6:e15850.
- 2010 • Ferguson SH, Dueck L, Loseto LL, **Luque SP**. Bowhead whale (*Balaena mysticetus*) seasonal selection of sea ice. *Marine Ecology Progress Series* 411:285-297.
- 2010 • **Luque SP**, Ferguson SH. Age structure, growth, mortality, and density of beluga (*Delphinapterus leucas*) in the Canadian Arctic: responses to environment? *Polar Biology* 33: 163-178.
- 2009 • **Luque SP**, Ferguson SH. Ecosystem regime shifts have not affected growth and survivorship of eastern Beaufort Sea belugas. *Oecologia* 160: 367-378.
- 2008 • **Luque SP**, Arnould JPY, Guinet C. Temporal structure of diving behavior in sympatric Antarctic and subantarctic fur seals. *Marine Ecology Progress Series* 372: 277-287.
- 2007 • **Luque SP**, Guinet C, Miller EH, Arnould JPYA, Kingston J, Chambellant M, Servera N, Dubroca L. Ontogenetic changes in body size and shape of Antarctic and Subantarctic fur seals: constraints imposed by lactation duration? *Canadian Journal of Zoology* 85: 1275-1285.
- 2007 • **Luque SP**. Diving behaviour analysis in R. *R News* 7(3): 8-14.
- 2007 • **Luque SP**, Guinet, C. A Maximum Likelihood approach for identifying dive bouts improves accuracy, precision, and objectivity. *Behaviour* 144: 1315-1322.
- 2007 • **Luque SP**, Higdon JW, Ferguson, SH. Dentine deposition rates in beluga (*Delphinapterus leucas*): an analysis of the evidence. *Aquatic Mammals* 33: 241-245.
- 2007 • **Luque SP**, Arnould, J.P.Y., Miller, E.H., Cherel, Y., Guinet, C. Foraging behaviour of sympatric Antarctic and subantarctic fur seals: does their contrasting duration of lactation make a difference? *Marine Biology* 152: 213-224.
- 2007 • **Luque SP**, Ferguson SH. Eastern Beaufort Sea beluga (*Delphinapterus leucas*) and ecosystem regime shifts. Report to the Fisheries Joint Management Committee (FJMC), available from <http://www.FJMC.ca>
- 2006 • **Luque SP**, Ferguson SH. Age structure, growth, and survival of Beaufort Sea beluga *Delphinapterus leucas*: a comparison among Canadian populations. Report to the Inuvialuit Fisheries Joint Fisheries Management Committee, available from <http://www.FJMC.ca>
- 2005 • Bailleul F, **Luque SP**, Dubroca L, Arnould JPY, Guinet C. Differences in foraging strategy and maternal behaviour between two sympatric fur seal species at the Crozet Islands. *Marine Ecology Progress Series* 293:273-282.
- 2003 • Arnould JPYA, **Luque SP**, Guinet C, Costa DP, Schaffer SA. The comparative energetics and growth strategies of sympatric Antarctic and Subantarctic fur seal pups at Îles Crozet. *Journal of Experimental Biology* 206:4497-4506.
- 2002 • **Luque SP**, Aurioles-Gamboa D. Estimation of body volume and body density in California sea lion pups. *Journal of the Marine Biological Association of the UK* 82:1019-1022.

## Publications (continued)

- 2002 • Parás A, Benítez MA, Brousset DM, Auriolos D, **Luque SP**, Godínez C. Field immobilization of the California sea lion (*Zalophus californianus*) with a portable anesthesia machine using isoflurane. *Hidrobiologia* **12:1-8**.
- 2001 • **Luque SP**, Auriolos-Gamboa D. Sex differences in body size and body condition of California sea lion (*Zalophus californianus*) pups from the Gulf of California. *Marine Mammal Science* **17:147-160**.
- 1999 • **Luque SP**. Comparación de la condición corporal de crías de lobo marino, *Zalophus californianus*, en once colonias reproductivas del Golfo de California. *M.Sc. Thesis, CICIMAR-IPN*.
- 1999 • Auriolos-Gamboa D, Godínez-Reyes C, Durán-Lizarraga ME, García-Rodríguez FJ, Hernández-Camacho CJ, **Luque SP**, Miller P, Ellis S. Conservation, assessment, and management plan for Mexican pinnipeds, and population viability and sea lion habitat analysis. *Report, IUCN/SSC Conservation and Breeding Specialist Group. Apple Valley, MN*.

## Reports and Presentations

- 2011 • **Luque SP**. Characterization of diving behaviour from depth time series: methods for zero-offset correction, and identification of bouts and dive phases. Invited oral presentation at “Objectively diving into the analysis of time-series depth recorder series and behavioral data records” workshop, Fourth International Science Symposium on Bio-logging, 14-18 March, 2011, Hobart, Tasmania.
- 2010 • **Luque SP**, Ferguson SH. Seasonal foraging behaviour of ringed seals in Hudson Bay. Oral presentation at the 2010 ArcticNet Annual Scientific Meeting. 14-17 December, 2010, Ottawa, Canada.
- 2010 • Pomerleau C, **Luque SP**, Ferguson SH, Lesage V, and Dueck LL. Bowhead whale (*Balaena mysticetus*) diving and movement patterns in the Eastern Canadian Arctic in relation to sea ice: implications for foraging ecology and habitat use. Poster presentation at the 2010 ArcticNet Annual Scientific Meeting. 14-17 December, 2010, Ottawa, Canada.
- 2010 • Pomerleau C, Lesage V, Ferguson SH, Dueck L, Winkler G, and **Luque SP**. Foraging ecology and habitat selection of bowhead whales (*Balaena mysticetus*) in the Canadian High Arctic. Poster presentation at the International Polar Year Oslo Science Conference, 8-12 June, 2010, Oslo, Norway.
- 2009 • **Luque SP**, Arnould, JPY, Guinet C. Prewaning physiological development and growth of sympatric Antarctic and subantarctic fur seals. Poster presentation at the XVIII Conference of the Society of Marine Mammalogy, 12-16 October, 2009, Quebec City, Canada.
- 2008 • **Luque SP**, Ferguson SH. Movements and Behaviour of Hudson Bay Ringed Seals (*Phoca hispida*). 2008 ArcticNet Annual Scientific Meeting. 9-12 December, 2008, Quebec City, Quebec, Canada.
- 2008 • **Luque SP**, Ferguson SH. Age structure, growth, and mortality of eastern Beaufort Sea beluga *Delphinapterus leucas*: a comparison among Canadian populations. Oral presentation at the 88th Annual Meeting of the American Association of Mammalogists, 21-25, 2008, Brookings, South Dakota, U.S.A.
- 2006 • **Luque SP**, Ferguson SH. Age structure, growth, and survival of Beaufort Sea beluga *Delphinapterus leucas*: a comparison among Canadian populations. Report presented at the 2006 ArcticNet Annual Scientific Meeting. 12-15 December, 2006, Victoria, B.C., Canada.

## Reports and Presentations (continued)

- 2005 • **Luque SP**, Guinet C, Miller EH, Arnould JPY, Kingston J, Chambellant M, Servera N, Dubroca N. Ontogenetic changes in body size and shape of Antarctic and subantarctic fur seals: constraints imposed by lactation duration? Poster presentation at the XVI Conference of the Society of Marine Mammalogy, 12-16 December, 2005, San Diego, U.S.A.
- 1999 • **Luque SP**, Aurióles-Gamboa D. Spatial variation in body condition of California sea lion, *Zalophus californianus*, pups in eleven rookeries of the Gulf of California. **Abstracts XXIV International Meeting for the Study of Marine Mammals, Mazatlán, Mexico, 18-22 April, 1999. \*Best Graduate Student Oral Presentation Award.**
- 1999 • Instituto Politécnico Nacional, CICIMAR-México. Population and feeding ecology three marine mammal species in Mexico. DEPI-IPN (CD968013).
- 1998 • Instituto Politécnico Nacional, CICIMAR-México. Project for the development of a management plan for the Espíritu Santo archipelago, B.C.S. Mexican Fund for the Conservation of Wildlife.
- 1997 • **Luque SP**, Aurióles-Gamboa D. Morphometric indices of body condition in California sea lion pups and their relationship with survival during their first year of life. **Abstracts XXII International Meeting for the Study of Marine Mammals, Nuevo Vallarta, Mexico, 27 April- 1 May, 1997.**
- 1997 • Instituto Politécnico Nacional, CICIMAR-México. Population and feeding ecology of the California sea lion in Bahía de La Paz, B.C.S., Golfo de California. CONABIO (FB285/HO81/96).

## References

- Available upon request.