

University of Hawaii at Manoa – Department of Oceanography

Honolulu, Hawaii USA

Current location: Sweden

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## Educational background

- 2009 Ph.D. Ichthyology and Fisheries Science  
Rhodes University, Grahamstown, South Africa
- 1997 M.S. Marine Sciences  
Moss Landing Marine Laboratories, California State University, San Jose
- 1991 B.S. Biological Sciences – Aquatic Biology/Chemistry Minor  
California State University, Sacramento

## Major professional and research interests

- Education: Creative writing and public outreach education in the natural sciences with presentations and teaching in laboratory sciences
- Fisheries ecology: Determining accurate life history characteristics for implementation in stock assessments and sustainable fisheries
- Sclerochronology: Use of natural growth structure to estimate age of fishes, deep-sea coral, and other marine or freshwater organisms
- Geochemical dating: Pioneering research in the use of geochemical methods to determine age and thermal histories marine organisms
- Radiocarbon: Innovative use of radiocarbon to validate age of marine and freshwater organisms and establishing new reference time-series

## Employment and Professional Experience

- 2014-*nunc* Position: AFFILIATE FACULTY – University of Hawaii, Manoa – Department of Oceanography & Marine Biology Graduate Program – Advise graduate students on thesis topics in scientific research through to publication. Serve as an official thesis advisor locally and abroad.
  - 2018-*nunc* CO-PRINCIPLE INVESTIGATOR – Coral and LA-AMS: A first time series for bomb radiocarbon. Partnership: Ion Beam Physics @ ETH Zürich
  - 2018-*nunc* CO-INVESTIGATOR – Pacific sleeper shark (*Somniosus pacificus*) eye lens radiocarbon age. Partnership: AFSC, Auke Bay Labs, and LLNL
  - 2019-2020 CO-INVESTIGATOR – Paleo-reconstruction of coral reef fish communities. Partnership: Smithsonian Tropical Research Institute (**Published**)
  - 2019-2020 PRINCIPAL INVESTIGATOR – Lifespan and growth of giant trevally in Hawaii. Partnership: Pacific Island Fisheries Group (**Published**)
  - 2018-2020 CO-INVESTIGATOR – Longevity and growth of alligator gar (*Atractosteus spatula*). Partnership: Texas Parks and Wildlife (**Published**)
  - 2018-2020 CO-INVESTIGATOR – Can bigmouth buffalo (*Ictiobus cyprinellus*) live 100 years? Partnership: North Dakota State University (**Published**)
  - 2017-2020 CO-PRINCIPAL INVESTIGATOR – Age validation of Atlantic yellowfin and bigeye tuna. Partnership: ICCAT/SEFSC & Univ. Maine (**Published**)
  - 2017-2020 CO-PRINCIPAL INVESTIGATOR and THESIS ADVISOR – Age and growth of opakapaka (*Pristipomoides filamentosus*) in Guam (Completed)
  - 2015-2019 CO-PRINCIPAL INVESTIGATOR and THESIS ADVISOR – Life history of ehu (*Etelis carbunculus*) in Hawaiian Islands (Completed)
  - 2014-2017 CO-PRINCIPAL INVESTIGATOR and THESIS ADVISOR – Investigations of age and growth of abyssal and hadal fishes (**Published**)  
*Note: First PhD student to graduate from the Marine Biology Graduate Program at University of Hawaii, Manoa.*
- 2010-2019 Position: VOLUNTEER EDUCATOR – Hawaii Sea Grant, Hanauma Bay Education Program - Assistance with the public education program associated with the Hanauma Bay Marine Reserve. Regular seminar speaker on the life history of fishes and the use of bomb radiocarbon in marine science.
- 2009-2019 Position: RESEARCH FISHERIES BIOLOGIST (ZP-0482-IV) – NOAA Fisheries, Pacific Islands Fisheries Science Center, Fisheries Research and Monitoring Division, Life History Program, Age and Longevity Research Laboratory - Age estimation and validation of marine organisms using innovative geochemical techniques (e.g. bomb radiocarbon & lead-radium dating). Colleague guidance and student mentoring on local, national, and international level. Execution and management of projects and budgets. Produce written proposals, final reports, and peer-reviewed publications.
  - 2017-2019 CO-PRINCIPAL INVESTIGATOR – Coral and bomb radiocarbon - new record for American Samoa. Partnership: USGS, Santa Cruz
  - 2016-2019 CO-INVESTIGATOR – Anthropogenic coral disturbance dating events with bomb radiocarbon. Partnership: Hawaii Pacific University
  - 2016-2017 PRINCIPAL INVESTIGATOR – Age and longevity validation of blue marlin. Partnership: Life History Program (**Published**)

- 2016-2017 CO-PRINCIPAL INVESTIGATOR – Life history of parrotfishes of Hawaii. Partnership: Life History Program (**Published**)
  - 2015-*nunc* CO-PRINCIPAL INVESTIGATOR – **New technology**: Laser ablation accelerator mass spectrometry for <sup>14</sup>C of marine carbonates - Red snapper in Gulf of Mexico and Hawaii coral (In progress). Partnership: Ion Beam Physics Lab – ETH University, Zürich (**Published** & ongoing research)
  - 2015 **FACTOR IV PROMOTION** – *Advanced to ZP-4 non-supervisory Research Fisheries Biologist based on Research and Publication Merit*
  - 2014-2019 PRINCIPAL INVESTIGATOR – Age-validated life history using bomb radiocarbon dating in support of Territorial Science. Partnership: University of Guam and University of the Ryukyus under grant from Saltonstall-Kennedy – Territorial Science (**Published** & ongoing research)
  - 2014-2019 PRINCIPAL INVESTIGATOR – Validation of age estimates for red snapper (*Lutjanus campechanus*) and gray snapper (*L. griseus*) in Gulf of Mexico. Partnership: Panama City Lab – SEFSC under internal MARFIN grant (**Published** & ongoing research)
  - 2014-2016 CO-PRINCIPAL INVESTIGATOR – Small-vessel survey and auction sampling to estimate growth and maturity of eteline snappers and improve data-limited stock assessments. Partnership: Stock Assessment Program under NOAA Science & Technology (Specimen acquisition)
  - 2014-2018 PRINCIPAL INVESTIGATOR – Age validation of red steenbras of South Africa. Partnership: South African Institute for Aquatic Biodiversity and Port Elizabeth Museum, South Africa (**Published**)
  - 2013-*nunc* CO-PRINCIPAL INVESTIGATOR – Age validation of European hake (*Merluccius merluccius*), pink dentex (*Dentex gibbosus*), and black coral of the Mediterranean. Partnership: National Concilium of Research, Sicily, Italy (**Published** & ongoing research)
  - 2012-2013 STUDENT ADVISOR – Summer Internship - Age and maturation of gindai (*Pristipomoides zonatus*). Partnership: University of Hawaii – Marine Option Program (Preliminary report with follow-up report)
  - 2012-2016 PRINCIPAL INVESTIGATOR – Bomb radiocarbon benchmarks of the central and western Tropical Pacific. Partnership: UC Santa Cruz (Kure Atoll coral) & University of the Ryukyus (Guam coral) (**Published 2x**)
  - 2012 **EMPLOYEE OF THE YEAR** at NOAA Fisheries, PIFSC – Recognition for significant advances in regional and national fisheries research.
  - 2011-2015 CO-PRINCIPAL INVESTIGATOR – Bomb radiocarbon dating of hawksbill sea turtle (*Eretmochelys imbricata*). Partnership: Marine Turtle Assessment Program, Protected Species Division. (**Published**)
  - 2011-2015 PRINCIPAL INVESTIGATOR – Bomb radiocarbon dating of bumphead parrotfish (*Bolbometopon muricatum*) and humphead wrasse (*Cheilinus undulatus*). Partnership: Office of Protected Resources, James Cook University, Australia, and NOAA Fisheries – PIFSC Guam (**Published**)
  - 2011-2013 CO-PRINCIPAL INVESTIGATOR – Bomb radiocarbon dating of Warsaw grouper (*Epinephelus nigritus*), speckled hind (*Epinephelus drummondhayi*), and sand tiger shark (*Carcharias taurus*). Partnership: Panama City Laboratory -SEFSC and NOAA Fisheries – Office of Protected Resources (**Published 2x**)
  - 2011 CO-PRINCIPAL INVESTIGATOR – Bomb radiocarbon dating of three important reef-fish species using Indo-Pacific  $\Delta^{14}\text{C}$  chronologies. Partnership: Western Australian Fisheries and Marine Research Laboratories (**Published**)
  - 2010-2019 PRINCIPAL and CO-PRINCIPAL INVESTIGATOR – Age estimation of bottom fishes from Hawaii and other regions of the Tropical Insular Pacific using otolith sections. Partnership: Various national and international organizations (Ongoing research)
  - 2009-2012 PRINCIPAL INVESTIGATOR – Age and longevity validation of opakapaka (*Pristipomoides filamentosus*). Partnership: Various national and international organizations (**Published**)
- 2004-2007 Position: INSTRUCTOR – Monterey Peninsula College, Physical Sciences – Astronomy 10 Laboratory for a Living Room Series class. Laboratories performed Friday nights and Saturday mornings during the regular semester. Outdoor labs performed with hands-on physics experiments and night-time telescope operations for 35 students each semester. Design and execution of new lab material with written contributions to student lab book.
- 1997-2009 Position: RESEARCH ASSOCIATE – Moss Landing Marine Laboratories, California State University - Management and operation of *Age and Longevity Research Laboratory* as a world-class facility in age estimation and validation of marine organisms. Produce written proposals, manage contracts and budgets, and write final reports and publications. Thesis advisor and student mentoring to publication.
- 2008-2009 PRINCIPAL INVESTIGATOR – The feasibility of lead-radium dating of opakapaka (*Pristipomoides filamentosus*) otoliths. Partnership: NOAA Fisheries, Pacific Islands Fisheries Science Center (**Published**)
  - 2008-2009 PRINCIPAL INVESTIGATOR – The feasibility of bomb radiocarbon dating ossicles from leatherback turtles (*Dermochelys coriacea*). Partnership: NOAA Fisheries, Beaufort Laboratory (not feasible)
  - 2008-2009 PRINCIPAL INVESTIGATOR – Lead-radium dating of blue roughy (*Gephyroberyx japonicus*). Partnership: National Museum of Marine Biology and Aquarium, Taiwan (in progress)

- 2007-2008 PRINCIPAL INVESTIGATOR – Lead-210 dating of Gulf of Alaska deep-sea corals. Partnership: NOAA Fisheries, Auke Bay Lab (**Published**)
  - 2007-2008 PRINCIPAL INVESTIGATOR – Lead-radium dating of golden tilefish (*Lopholatilus chamaeleonticeps*). Partnership: NOAA Fisheries, SEFSC (**Student M.S. thesis & Published**)
  - 2006-2009 PRINCIPAL INVESTIGATOR – Bomb radiocarbon and lead-210 dating of red (*Haliotis rufescens*) and white abalone (*H. sorenseni*). Partnership: California Sea Grant (**Published** & ongoing research)
  - 2004-2009 CO-PRINCIPAL INVESTIGATOR – Radiocarbon in sharks: Age and growth investigations. Partnership: University of Florida (**Published**)
  - 2004-2006 CO-PRINCIPAL INVESTIGATOR – Bamboo coral of New Zealand: Age and growth investigations. Partnership: NIWA (**Published**)
  - 2003-2008 CO-PRINCIPAL INVESTIGATOR – Radiometric age validation of Patagonian and Antarctic toothfishes (*Dissostichus eleginoides* and *D. mawsoni*). Partnership: National Science Foundation (**My Ph.D. dissertation, a Student M.S. thesis, & Published 2x**)
  - 2002-2009 PRINCIPAL and CO-PRINCIPLE INVESTIGATOR – Series of projects on age validation of deep-water fishes of New Zealand using lead-radium dating (Five commercially important species). Partnership: NIWA, New Zealand (**Published 2x** & 3 Technical Reports)
  - 2002-2004 CO-PRINCIPAL INVESTIGATOR – Bomb carbon in the yelloweye rockfish as a chronological benchmark for age validation of commercially important fishes. Partnership: California Sea Grant and Lawrence Livermore National Laboratory (**Student M.S. thesis & Published**)
  - 2002-2003 CO-PRINCIPAL INVESTIGATOR – Age and growth determination of deep-sea corals from the Davidson Seamount. Partnership: Monterey Bay National Marine Sanctuary (**Published**)
  - 2001-2003 CO-PRINCIPAL INVESTIGATOR – Radiometric age validation and demographic analysis of commercially important, long-lived rockfishes. Partnership: California Sea Grant (**Student M.S. thesis**)
  - 2000-2001 CO-PRINCIPAL INVESTIGATOR – Radiometric age validation of two deep-water fishes: yelloweye (*Sebastes ruberrimus*) and blackgill (*S. melanostomus*) rockfishes. Partnership: California Sea Grant and AK Department of Fish and Game (**Student M.S. thesis & Published 2x**)
  - 1999-2001 CO-PRINCIPAL INVESTIGATOR – Age and growth of two deep-sea, habitat-forming octocorallian corals of the Gulf of Alaska and Bering Sea, with radiometric age validation and climate correlation. Partnership: Department of Commerce through University of Alaska, Fairbanks (**Published**)
  - 1999-2000 CO-INVESTGATOR – Feasibility of age validation of coelacanth (*Latimeria chalumnae*) using lead-radium dating. Partnership: Max Planck Institute, GEOMAR Helmholtz Centre for Ocean Research Kiel, University of Guelph (not feasible due to radiometric limitations)
  - 1998-1999 CO-INVESTIGATOR – Application of radiometric age determination to the bocaccio rockfish (*Sebastes paucispinis*). Partnership: California Sea Grant, CA Department of Fish and Game, NOAA Fisheries - Santa Cruz (**Published**)
  - 1997-1998 CO-INVESTIGATOR – Reliability assessment of season-of-capture determination for archaeological otoliths. Partnership: Anthropological Studies Center - Sonoma State, California Polytechnic State University and CSU Bakersfield (**Published**)
- 1992-1996 Position: GRADUATE STUDENT INTERN – Moss Landing Marine Laboratories, California State University – Contribute to research opportunities for educational purposes. Produce written proposals, final reports, and publications.
- 1996 STUDENT RESEARCHER – Radiometric age determination of the Atlantic sturgeon (*Acipenser oxyrinchus*): a feasibility study using pectoral fin rays. Partnership: Hudson River Foundation and Old Dominion University. (**Published**)
  - 1994-1996 STUDENT RESEARCHER – Feasibility study for the application of radiometric age determination to the Atlantic tarpon (*Megalops atlanticus*). Partnership: Florida Department of Environmental Protection (**Published**)
  - 1994-1996 STUDENT RESEARCHER – Age, growth, and age validation of the spotted sand bass (*Paralabrax maculatofasciatus*) in Baja, Mexico. Partnership: Classmates in Ichthyology at MLML (**Published**)
  - 1994-1995 STUDENT RESEARCHER – Preliminary application of radiometric age determination to the yelloweye rockfish, *Sebastes ruberrimus*. Partnership: AK Department of Fish and Game (**Published**)
  - 1992-1995 GRADUATE STUDENT TRAINEE – Radiometric age verification of commercially important deep-sea fishes of California. Partnership: California Sea Grant and CA Department of Fish and Game (**My M.S. thesis & Published 2x**)
  - 1992-1993 STUDENT RESEARCHER – Survey of deep-sea fauna off the Farallon Islands, Pioneer Seamount, and Monterey Bay Canyon. Partnership: United States Navy on R/V Point Sur and R/V Wecoma (**Published**)
  - 1990-1991 STUDENT RESEARCHER – Glacial and non-glacial fjord faunal survey in Southeastern Alaska (R/V Alpha Helix)

1991-2007 Position: LABORATORY TECHNICIAN/TEACHING ASSISTANT – Monterey Peninsula College, Physical Sciences - Teaching and teaching assistance in Astronomy and Physics. Managed astronomy laboratory and field trip logistics, including several hands-on overnight observational field trips each semester for >120 students. Managed student aide workforce for classroom assistance in astronomy labs. Maintained astronomy equipment and a functional physics shop. Design and execution of new lab material with student lab book composition.

**Note:** Very few university astronomy programs are a 4-unit field laboratory with hands-on student training and use of telescopes in the field with active first-hand observations of celestial objects – this class was extremely popular during my 16 years of service.

## Ph.D. Dissertation (Rhodes University)

**Andrews, A.H.** 2009. Lead-radium dating of two deep-water fishes from the southern hemisphere, Patagonian toothfish (*Dissostichus eleginoides*) and orange roughy (*Hoplostethus atlanticus*). Ph.D. Dissertation, Department of Ichthyology and Fisheries Science, Rhodes University, Grahamstown, South Africa. (**Published 2x**)

## M.S. Thesis (Moss Landing Marine Laboratories)

**Andrews, A.H.** 1997. Age and growth of the Pacific grenadier (family Macrouridae, *Coryphaenoides acrolepis*) with age estimate validation using an improved radiometric ageing technique. M.S. Thesis, Moss Landing Marine Laboratories, California State University, San Jose. (**Published 2x**)

## Publications – Journal Articles

Passerotti, M.S., **A.H. Andrews**, and L.J. Natanson. In Prep. Inferring life history characteristics of the oceanic whitetip shark *Carcharhinus longimanus* from vertebral bomb radiocarbon. Submitted to *Frontiers in Marine Science*.

**Andrews, A.H.**, B.K. Barnett, J.P. Chanton, L. Thornton, and R. Allman. 2020. Influences of upper Floridan Aquifer waters on radiocarbon in the otoliths of gray snapper (*Lutjanus griseus*) in the Gulf of Mexico. *Radiocarbon* XX: xxx-xxx (dx.doi.org/10.1017/RDC.2020.29)

Note: **Accolades from Associate Editor and peer reviewers**

**Andrews, A.H.** 2020. Giant Trevally (*Caranx ignobilis*) of Hawaiian Islands can live 25 years. *Marine and Freshwater Research* XX: xxx-xxx (dx.doi.org/10.1071/MF19385)

**Andrews, A.H.**, A. Pacico, R. Allman, B.J. Falterman, E.T. Lang, and W. Golet. 2020. Validated longevity of yellowfin (*Thunnus albacares*) and bigeye (*Thunnus obesus*) tuna of the northwestern Atlantic Ocean. *Canadian Journal of Fisheries and Aquatic Science* 77: 637–643 (dx.doi.org/10.1139/cjfas-2019-0328)

Daugherty, D.J., **A.H. Andrews**, and N.G. Smith. 2019. Otolith-based age estimates of alligator gar assessed using bomb radiocarbon dating to greater than 60 years. *North American Journal of Fisheries Management* 40: 613-621 (dx.doi.org/10.1002/nafm.10390)

**Andrews, A.H.**, C. Yeman, C. Welte, B. Hattendorf, L. Wacker, and M. Christl. 2019. Laser ablation AMS reveals complete bomb <sup>14</sup>C signal in an otolith with confirmation of 60-year longevity for red snapper (*Lutjanus campechanus*). *Marine and Freshwater Research* 70: 1768–1780 (dx.doi.org/10.1071/MF18265)

Lackmann, A.R., **A.H. Andrews**, M.G. Butler, E.S. Bielak-Lackmann, and M.E. Clark. 2019. Bigmouth Buffalo *Ictiobus cyprinellus* sets freshwater teleost record as improved age analysis reveals centenarian longevity. *Communications Biology* 2, Article #197 (dx.doi.org/10.1038/s42003-019-0452-0)

**Andrews, A.H.**, E.E. DeMartini, J. Brodziak, R.S. Nichols, and R.L. Humphreys. 2019. Growth, longevity, and age at first maturity and sex change of Hawaiian grouper (*Hyporhamphus quernus*) – input for management and conservation of a large, slow-growing grouper. *Canadian Journal of Fisheries and Aquatic Science* 76: 1874–1884 (dx.doi.org/10.1139/cjfas-2018-0170)

Lin, C.-H., B. De Gracia, M.E.R. Pierotti, **A.H. Andrews**, K. Griswold, and A. O'Dea. 2019. Otoliths in coral reef sediments can help reconstruct past reef fish communities. *PLOS ONE* 14(6): e0218413 (dx.doi.org/10.1371/journal.pone.0218413)

**Andrews, A.H.**, M.J. Smale, P.D. Cowley, and N. Chang. 2018. Fifty-five-year longevity for the largest member of family Sparidae, the endemic red steenbras *Petrus rupestris* from South Africa. *African Journal of Marine Science* 40: 343–353 (dx.doi.org/10.2989/1814232X.2018.1520148)

DeMartini, E.E., **A.H. Andrews**, K.G. Howard, B.M. Taylor, D.-C. Lou, and M.K. Donovan. 2018. Comparative growth, age at maturity and sex change, and longevity of Hawaiian parrotfishes, with bomb radiocarbon validation. *Canadian Journal of Fisheries and Aquatic Science* 75: 580–589 (dx.doi.org/10.1139/cjfas-2016-0523)

**Andrews, A.H.**, R.L. Humphreys, and J.D. Sampaga. 2018. Blue marlin (*Makaira nigricans*) longevity estimates confirmed with bomb radiocarbon dating. *Canadian Journal of Fisheries and Aquatic Science* 75: 17-25 (dx.doi.org/10.1139/cjfas-2017-0031)

Gerringer, M.E., **A.H. Andrews**, G.R. Huss, K. Nagashima, N.D. Gallo, M.R. Clark, T.D. Linley, A.J. Jamieson, and J.C. Drazen. 2018. Life history of abyssal and hadal fishes from otolith growth zones and oxygen isotopes. *Deep Sea Research Part I* 132:37–50 (dx.doi.org/10.1016/j.dsr.2017.12.002)

- Newman, S.J., C.B. Wakefield, A.J. Williams, J.M. O'Malley, B.M. Taylor, S.J. Nicol, R.S. Nichols, S.A. Hespa, N.G. Halla, N. Hill, J.J.L. Ong, **A.H. Andrews**, C.M. Wellington, E.S. Harvey, P. Mous, Z.S. Oyafuso, C. Pardee, M. Bunce, J.D. DiBattista, and B.R. Moore. 2017. International workshop on advancing methods to overcome challenges associated with life history and stock assessments of data-poor deep-water snappers and groupers. *Marine Policy* 79: 78-83 (dx.doi.org/10.1016/j.marpol.2017.02.009)
- Tracey, D.M., **A.H. Andrews**, P.L. Horn, and H.L. Neil. 2017. Another New Zealand centenarian – Age validation of black cardinalfish (*Epigonus telescopus*) using lead-radium and bomb radiocarbon dating. *Marine and Freshwater Research* 68: 352-360 (dx.doi.org/10.1071/MF15267)
- Andrews, A.H.**, R. Asami, Y. Iryu, D.R. Kobayashi, and F. Camacho. 2016. Bomb-produced radiocarbon in the western tropical Pacific Ocean–Guam coral reveals operation-specific signals from the Pacific Proving Grounds. *Journal of Geophysical Research – Oceans* 121: 6351-6366 (dx.doi.org/10.1002/2016JC012043)
- Note: **Highlighted by the Journal Editor with AGU Publications with accolades from peer reviewers**
- Andrews, A.H.**, E.E. DeMartini, J.A. Eble, B.M. Taylor, D.C. Lou, and R.L. Humphreys. 2016. A half-century lifespan for a keystone browser, the bluespine unicornfish (*Naso unicornis*), with a novel approach to bomb radiocarbon dating in the tropical North Pacific Ocean. *Canadian Journal of Fisheries and Aquatic Science* 73: 1575-1586 (dx.doi.org/10.1139/cjfas-2016-0019)
- Welte, C., L. Wacker, B. Hattendorf, M. Christl, J. Fohlmeister, S.F.M. Breitenbach, L.F. Robinson, **A.H. Andrews**, A. Freiwald, J.R. Farmer, C. Yeman, H.-A. Synal, and D. Günther. 2016. Laser Ablation – Accelerator Mass Spectrometry: a novel approach for rapid radiocarbon analyses of carbonate archives at high spatial resolution. *Analytical Chemistry* 88: 8570-8576 (dx.doi.org/10.1021/acs.analchem.6b01659)
- Andrews, A.H.**, D. Siciliano, D.C. Potts, E.E. DeMartini, and S. Covarrubias. 2016. Bomb radiocarbon and the Hawaiian Archipelago: Coral, otoliths and seawater. *Radiocarbon* 58(3): 531-548 (dx.doi.org/10.1017/RDC.2016.32)
- Vitale S., **A.H. Andrews**, P. Rizzo, S. Gancitano, and F. Fiorentino. 2016. 25-year longevity for European hake (*Merluccius merluccius*) from novel use of bomb radiocarbon dating in the Mediterranean Sea. *Marine and Freshwater Research* 67: 1077-1080. Proceedings of the 5<sup>th</sup> International Otolith Symposium (dx.doi.org/10.1071/MF15376)
- Van Houtan, K.S., **A.H. Andrews**, T.T. Jones, S.K.K. Murakawa, and M.E. Hagemann. 2016. Time in tortoiseshell: a bomb radiocarbon-validated chronology in sea turtle scutes. *Proceedings of the Royal Society B* 283(1822): 2015.2220 (dx.doi.org/10.1098/rspb.2015.2220)
- Andrews, A.H.** 2016. Lead-radium dating of Pacific cod (*Gadus macrocephalus*) – validation of the young-fish scenario. *Marine and Freshwater Research* 67: 1982-1986 (dx.doi.org/10.1071/MF15228) Note: *I provided journal volume cover image (colleague took photograph)*
- Lombardi-Carlson, L.A., and **A.H. Andrews**. 2015. Age estimation and lead-radium dating of golden tilefish, *Lopholatilus chamaeleonticeps*. *Environmental Biology of Fishes* 98(7): 1787-1801 (dx.doi.org/10.1007/s10641-015-0398-0)
- Newman, S.J., C.B. Wakefield, A.J. Williams, J.M. O'Malley, S.J. Nicol, E.E. DeMartini, T. Halafih, J. Kaltavara, R.L. Humphreys, B.M. Taylor, **A.H. Andrews**, and R.S. Nichols. 2015. International workshop on methodological evolution to improve estimates of life history parameters and fisheries management of data-poor deep-water snappers and groupers. *Marine Policy* 60: 182-185 (dx.doi.org/10.1016/j.marpol.2015.06.020)
- Andrews, A.H.**, J.H. Choat, R.J. Hamilton, and E.E. DeMartini. 2015. Refined bomb radiocarbon dating of two iconic fishes of the Great Barrier Reef. *Marine and Freshwater Research* 66: 305-316 (dx.doi.org/10.1071/MF14086)
- Andrews, A.H.**, and L.A. Kerr. 2015. Estimates of maximum age for white sharks of the northeastern Pacific Ocean: altered perceptions of vertebral growth shed light on complicated bomb  $\Delta^{14}\text{C}$  results. *Environmental Biology of Fishes* 98(3): 971-978 (dx.doi.org/10.1007/s10641-014-0326-8)
- Passerotti, M.S., **A.H. Andrews**, J.K. Carlson, S.P. Wintner, K.J. Goldman, and L.J. Natanson. 2014. Maximum age and missing time in the vertebrae of sand tiger shark (*Carcharias taurus*): validated lifespan from bomb radiocarbon dating in the western North Atlantic and southwestern Indian Oceans. *Marine and Freshwater Research* 65: 1131-1140 (dx.doi.org/10.1071/MF13214)
- Note: **I designed journal volume cover image**
- Cotton, C.F., **A.H. Andrews**, G.M. Cailliet, R. Dean Grubbs, S.B. Irvine, and J.A. Musick. 2014. Assessment of radiometric dating for age validation of deep-water dogfish (Order: Squaliformes) finspines. *Fisheries Research* 151: 107-113 (dx.doi.org/10.1016/j.fishres.2013.10.014)
- Andrews, A.H.**, R.T. Leaf, L. Rogers-Bennett, M. Neuman, H. Hawk, and G.M. Cailliet. 2013. Bomb radiocarbon dating of the endangered white abalone (*Haliotis sorenseni*): investigations of age, growth and lifespan. *Marine and Freshwater Research* 64: 1029-1039 (dx.doi.org/10.1071/MF13007)
- Andrews, A.H.**, B.K. Barnett, R.J. Allman, R.P. Moyer, H.D. Trowbridge. 2013. Great longevity of speckled hind (*Epinephelus drummondhayi*), a deep-water grouper, with novel use of postbomb radiocarbon dating in the Gulf of Mexico. *Canadian Journal of Fisheries and Aquatic Science* 70(8): 1131-1140 (dx.doi.org/10.1139/cjfas-2012-0537)

- Andrews, A.H.**, E.E. DeMartini, J. Brodziak, R.S. Nichols, and R.L. Humphreys. 2012. A long-lived life history for a tropical, deep-water snapper (*Pristipomoides filamentosus*): bomb radiocarbon and lead-radium dating as extensions of daily increment analyses in otoliths. *Canadian Journal of Fisheries and Aquatic Science* 69: 1850-1869 (dx.doi.org/10.1139/f2012-109)
- Allen, L.G., and **A.H. Andrews**. 2012. Bomb radiocarbon dating and estimated longevity of Giant Sea Bass (*Stereolepis gigas*). *Bulletin of Southern California Academy of Sciences* 111(1): 1-14
- Ashford, J., M. Dinniman, C. Brooks, **A.H. Andrews**, E. Hofmann, G. Cailliet, C. Jones, and N Ramanna. 2012. Does large-scale ocean circulation structure life history connectivity in Antarctic toothfish (*Dissostichus mawsoni*)? *Canadian Journal of Fisheries and Aquatic Science* 69(12): 1903-1919 (dx.doi.org/10.1139/f2012-111)
- Carreiro-Silva, M., **A.H. Andrews**, A. Braga-Henriques, V. de Matos, F.M. Porteiro, and R.S. Santos. 2012. Variability in growth rates of long-lived black coral *Leiopathes* sp. from the Azores (Northeast Atlantic). *Marine Ecological Progress Series* 473: 189-199 (dx.doi.org/10.3354/meps10052)
- Andrews, A.H.**, J.R. Ashford, C.M. Brooks, K. Krusic-Golub, G. Duhamel, M. Belchier, C.C. Lundstrom, and G.M. Cailliet. 2011. Lead-radium dating provides a framework for coordinating age estimation of Patagonian toothfish (*Dissostichus eleginoides*) between fishing areas. *Marine and Freshwater Research* 62: 781-789 (dx.doi.org/10.1071/MF10225)
- Andrews, A.H.**, K.M. Kalish, S.J. Newman, and J.M. Johnston. 2011. Bomb radiocarbon dating of three important reef-fish species using Indo-Pacific  $\Delta^{14}\text{C}$  chronologies. *Marine and Freshwater Research* 62(11): 1259-1269 (dx.doi.org/10.1071/MF11080)
- Note: **I designed journal volume cover image**
- Andrews, A.H.**, L.J. Natanson, L.A. Kerr, G.H. Burgess, and G.M. Cailliet. 2011. Bomb radiocarbon and tag-recapture dating of sandbar shark (*Carcharhinus plumbeus*). *Fishery Bulletin* 109: 454-465
- Brooks C.M., **A.H. Andrews**, J.R. Ashford, N. Ramanna, C.D. Jones, C.C. Lundstrom, G.M. Cailliet. 2011. Age estimation and lead-radium dating of Antarctic toothfish (*Dissostichus mawsoni*) in the Ross Sea. *Polar Biology* 34:329-338 (dx.doi.org/10.1007/s00300-010-0883-z)
- Andrews, A.H.**, R.P. Stone, C.C. Lundstrom, and A.P. DeVogelaere. 2009. Growth rate and age determination of bamboo corals from the northeastern Pacific Ocean using refined  $^{210}\text{Pb}$  dating. *Marine Ecological Progress Series* 397: 173-185. (dx.doi.org/10.3354/meps08193)
- Andrews, A.H.**, D.M. Tracey, and M.R. Dunn. 2009. Lead-radium dating of orange roughy (*Hoplostethus atlanticus*): validation of a centenarian life span. *Canadian Journal of Fisheries and Aquatic Science* 66(7): 1130-1140 (dx.doi.org/10.1139/F09-059)
- Kneebone, J., L.J. Natanson, **A.H. Andrews**, and H. Howell. 2008. Using bomb radiocarbon analyses to validate age and growth estimates for the tiger shark, *Galeocerdo cuvier*, in the western North Atlantic. *Marine Biology* 154: 423-434
- Leaf, R.T., **A.H. Andrews**, G.M. Cailliet, and T.A. Brown. 2008. The feasibility of bomb radiocarbon analysis to support an age-at-length relationship for red abalone, *Haliotis rufescens* Swainson in northern California. *Journal of Shellfish Research* 27(5): 1177-1182
- Sanders, R.D., K.H. Coale, G.A. Gill, **A.H. Andrews**, and M. Stephenson. 2008. Recent increase in atmospheric deposition of mercury to California aquatic systems inferred from a 300-year geochronological assessment of lake sediments. *Applied Geochemistry* 23: 399-407
- Andrews, A.H.**, L.A. Kerr, G.M. Cailliet, T.A. Brown, C.C. Lundstrom, and R.D. Stanley. 2007. Age validation of canary rockfish (*Sebastes pinniger*) using two independent otolith techniques: lead-radium and bomb radiocarbon dating. *Marine and Freshwater Research* 58: 531-541
- Love, M.S., M.M. Yoklavich, B.A. Black, and **A.H. Andrews**. 2007. Age of black coral (*Antipathes dendrochristos*) colonies, with notes on associated invertebrate species. *Bulletin of Marine Science* 80(2): 391-400
- Tracey, D.M., H. Neil, P. Marriot, **A.H. Andrews**, G.M. Cailliet, J.A. Sanchez. 2007. Age and growth of two genera of deep-sea bamboo corals (family Isididae) in New Zealand waters. Proceedings of the 3<sup>rd</sup> International Symposium on Deep-Sea Corals. *Bulletin of Marine Science* 81(3): 393-408
- Ardizzone, D.A., G.M. Cailliet, L.J. Natanson, **A.H. Andrews**, L.A. Kerr and T.A. Brown. 2006. Application of bomb radiocarbon chronologies to shortfin mako (*Isurus oxyrinchus*) age validation. *Environmental Biology of Fishes* 77: 355-366
- Kerr, L.A., **A.H. Andrews**, G.M. Cailliet, T.A. Brown, and K.H. Coale. 2006. Investigations of  $\Delta^{14}\text{C}$ ,  $\delta^{15}\text{N}$ , and  $\delta^{13}\text{C}$  in vertebrae of white shark (*Carcharodon carcharias*) from the eastern Pacific Ocean. *Environmental Biology of Fishes* 77: 337-353
- Andrews, A.H.**, E.J. Burton, L.A. Kerr, G.M. Cailliet, K.H. Coale, C.C. Lundstrom and T.A. Brown. 2005. Bomb radiocarbon and lead-radium disequilibria in otoliths of bocaccio rockfish (*Sebastes paucispinis*): a determination of age and longevity for a difficult-to-age fish. Proceedings of the 3<sup>rd</sup> International Symposium on Otolith Research and Application. *Marine and Freshwater Research* 56: 517-528
- Andrews, A.H.**, Laman, E.A., Bennett, T., Jones, E. and Cailliet, G.M. 2005. Age and growth of the spotted sand bass, *Paralabrax maculatofasciatus*, in Bahia de Los Angeles, Baja Norte, Mexico with age validation using otolith edge analysis. *Bulletin of Southern California Academy of Sciences* 104(1): 14-25

- Kerr, L.A., **A.H. Andrews**, B.R. Frantz, K.H. Coale, T.A. Brown, K. Munk, and G.M. Cailliet. 2005. Age validation of quillback rockfish (*Sebastes maliger*) using bomb radiocarbon. *Fishery Bulletin* 103(1): 97-107
- Kerr, L.A., **A.H. Andrews**, B.R. Frantz, K.H. Coale, T.A. Brown, and G.M. Cailliet. 2004. Radiocarbon in otoliths of yelloweye rockfish (*Sebastes ruberrimus*): a reference time series for the coastal waters of southeast Alaska. *Canadian Journal of Fisheries and Aquatic Science* 61: 443-451
- Stevens, M.M., **A.H. Andrews**, G.M. Cailliet, K.H. Coale, C.C. Lundstrom. 2004. Radiometric validation of age, growth, and longevity for the blackgill rockfish, *Sebastes melanostomus*. *Fishery Bulletin* 102: 711-722
- Andrews, A.H.**, K.W. Gobalet, and T.L. Jones. 2003. Reliability assessment of season-of-capture determination from archaeological otoliths. *Bulletin of Southern California Academy of Sciences* 102(2): 66-78
- Andrews, A.H.**, G.M. Cailliet, K.H. Coale, K.M. Munk, M.M. Mahoney, and V.M. O'Connell. 2002. Radiometric age validation of the yelloweye rockfish (*Sebastes ruberrimus*) from southeastern Alaska. *Marine and Freshwater Research* 53: 139-146
- Andrews, A.H.**, E. Cordes, M.M. Mahoney, K. Munk, K.H. Coale, G.M. Cailliet, and J. Heifetz. 2002. Age and growth and radiometric age validation of a deep-sea, habitat-forming gorgonian (*Primnoa resedaeformis*) from the Gulf of Alaska. *In: Biology of cold water corals*. Eds: L. Watling and M. Risk. *Hydrobiologia* 471: 101-110
- Wilson, M.T., **A.H. Andrews**, A.L. Brown, and E.E. Cordes. 2002. Axial rod growth and age estimation of the sea pen, *Halopteris willemoesi* Kölliker. *In: Biology of cold water corals*. Eds: L. Watling and M. Risk. *Hydrobiologia* 471: 133-142
- Andrews, A.H.**, E.J. Burton, K.H. Coale, G.M. Cailliet, and R.E. Crabtree. 2001. Application of radiometric age determination to the Atlantic tarpon, *Megalops atlanticus*. *Fishery Bulletin* 99: 389-398
- Cailliet, G.M., **A.H. Andrews**, E.J. Burton, D.L. Watters, D.E. Kline, and L.A. Ferry-Graham. 2001. Age determination and validation studies of marine fishes: do deep-dwellers live longer? *Experimental Gerontology* 36: 739-764
- Andrews, A.H.**, G.M. Cailliet, K.H. Coale. 1999. Age and growth of the Pacific grenadier (*Coryphaenoides acrolepis*) with age estimate validation using an improved radiometric ageing technique. *Canadian Journal of Fisheries and Aquatic Science* 56: 1339-1350 (dx.doi.org/10.1139/f99-054)
- Andrews, A.H.**, K.H. Coale, J.L. Nowicki, C. Lundstrom, Z. Palacz, E.J. Burton, and G.M. Cailliet. 1999. Application of an ion-exchange separation technique and thermal ionization mass spectrometry to <sup>226</sup>Ra determination in otoliths for radiometric age determination of long-lived fishes. *Canadian Journal of Fisheries and Aquatic Science* 56: 1329-1338 (dx.doi.org/10.1139/f99-053)
- Cailliet, G.M., **A.H. Andrews**, W.W. Wakefield, G. Moreno, and K.L. Rhodes 1999. Fish faunal and habitat analyses using trawls, camera sleds and submersibles in benthic deep-sea habitats off central California. *Oceanologica Acta* 22: 579-592

## Publications – Books

- Natanson, L.J., **A.H. Andrews**, M.S. Passerotti, and S.P. Wintner. 2019. The history and mystery of age and growth studies in elasmobranchs: Common methods and room for improvement. Pp. 177–199. *In: Shark Research: Emerging Technologies and Applications for the Field and Laboratory*. 1<sup>st</sup> Edition. Eds: J.C. Carrier, M.R. Heithaus, and C.A. Simphendorfer. CRC Marine Biology Series. CRC Press. New York.
- Goldman, K.J., G.M. Cailliet, **A.H. Andrews**, and L.J. Natanson. 2012. Assessing the age and growth of chondrichthyan fishes. *In: Biology of sharks and their relatives*. 2<sup>nd</sup> Edition. Eds: J.C. Carrier, J.A. Musick, and M.R. Heithaus. CRC Marine Biology Series. CRC Press. New York. pp. 423-451
- Cailliet, G.M., and **A.H. Andrews**. 2008. Age-validated longevity of fishes: Its importance for sustainable fisheries. *In: Fisheries for global welfare and environment*. Eds: K. Tsukamoto, T. Kawamura, T. Takeuchi, T.D. Beard, Jr., and M.J. Kaiser. 5th World Fisheries Congress 2008, TERRAPUB, Tokyo, Japan. pp. 103-120
- Paul, L., D. Tracey, H. Neil, **A.H. Andrews**, and R. Sparks. 2006. How old are these deep-sea species: Applying improved techniques to validate longevity. *In: Deep Sea 2003: Conference on the governance and management of deep-sea fisheries*. Ed: R. Sotton. FAO Fisheries Proceedings 3/2: 94-96
- Andrews, A.H.**, G.M. Cailliet, L.A. Kerr, K.H. Coale, C. Lundstrom, and A. DeVogeleare. 2005. Investigations of age and growth for three species of deep-sea coral from the Davidson Seamount off central California. *In: Cold-water Corals and Ecosystems*. Eds: A. Freiwald and J.M. Roberts. Proceedings of the Second International Symposium on Deep Sea Corals. Erlangen, Germany. September 8-13, 2003. Springer Berlin Heidelberg New York. pp. 965-982
- Burton, E.J., **A.H. Andrews**, K.H. Coale, and G.M. Cailliet. 1999. Application of radiometric age determination to three long-lived fishes using <sup>210</sup>Pb:<sup>226</sup>Ra disequilibria in calcified structures: A review. *In: Life in the Slow Lane: Ecology and Conservation of Long-lived Marine Animals*. Ed: J.A. Musick. American Fisheries Society Symposium 23, Bethesda, Maryland. pp. 77-87

## Technical Publications

- Prouty N.G., E.B. Roark, **A.H. Andrews**, L. Robinson, T. Hill, O. Sherwood, B. Willams, T. Guilderson, and S. Fallon. 2017. Age, Growth Rates, and Paleoclimate Studies of Deep Sea Corals. *In: The State of Deep-Sea Coral and Sponge Ecosystems of the United States*. Eds: Hourigan T.F., Etnoyer P.J., Cairns S.D. NOAA Technical Memorandum NMFS-OHC-4. Silver Spring, MD. Pp. 299-319. ([https://deepseacoraldata.noaa.gov/library/2015-state-of-dsc-report-folder/NOAA\\_State-of-DSC-Ecosystems\\_2017\\_OHC-TM04.pdf](https://deepseacoraldata.noaa.gov/library/2015-state-of-dsc-report-folder/NOAA_State-of-DSC-Ecosystems_2017_OHC-TM04.pdf))
- O'Malley, J.M., B.M. Taylor, and **A.H. Andrews**. 2016. Feasibility of Ageing Hawaiian Archipelago Uku (*Aprion virescens*). NOAA Administrative Report H-16-06.
- Brodziak, J., A. Yau, J. O'Malley, **A. Andrews**, R. Humphreys, E. DeMartini, M. Pan, M. Parke, and E. Fletcher. 2014. Stock Assessment Update for Main Hawaiian Islands Deep7 Bottomfish Complex Through 2013 With Projected Annual Catch Limits Through 2016. NOAA Technical Memorandum NMFS-PIFSC-42
- Andrews, A.H.**, R.L. Humphreys, E.E. DeMartini, R.S. Nichols, and J. Brodziak. 2011. Bomb radiocarbon and lead-radium dating of opakapaka (*Pristipomoides filamentosus*). PIFSC, NMFS, NOAA, Honolulu, HI 96822-2396. PIFSC Admin. Rep. H-11-07, 58 p.
- Brodziak, J., D. Courtney, L. Wagatsuma, J. O'Malley, H-H. Lee, W. Walsh, **A. Andrews**, R. Humphreys, and G. DiNardo. 2011. Stock assessment of the main Hawaiian Islands Deep7 bottomfish complex through 2010. U.S. DOC, NOAA Technical Memorandum NMFS-PIFSC-29, 176 p.
- Marriott, P.M. **A.H. Andrews**, and M.J. Manning. 2010. Investigating blue mackerel (*Scomber australasicus*) age-estimation error. Objective Three: Validate blue mackerel catch-at-age. Final Research Report for Ministry of Fisheries Research Project EMA2005-02. NIWA, Wellington, New Zealand. 23 p.
- Sutton, C.P., D.M. Tracey, **A.H. Andrews**, A.C. Hart, and D.J. MacGibbon. 2010. Validated age and growth of ribaldo (*Mora moro*). New Zealand Fisheries Assessment Report 2010/24. NIWA, Wellington, New Zealand. 26 p.
- Andrews, A.H.**, C.C. Lundstrom, G.M. Cailliet, and A.P. DeVogelaere. 2007. Investigations of bamboo coral age and growth from Davidson Seamount. Monterey Bay National Marine Sanctuary Technical Report. NOAA Monterey, California. 34 p.
- Andrews, A.H.** and D.M. Tracey. 2007. Age validation of orange roughy and black cardinalfish using lead-radium dating. Final Research Report for Ministry of Fisheries Res. Project DEE2005/02. NIWA, Wellington, New Zealand. 40 p.
- Tracey, D.M., P.L. Horn, **A.H. Andrews**, P.M. Marriott, and M.R. Dunn. 2007. Age, growth, and investigations of age validation of lookdown dory (*Cyttus traversi*). Final Research Report for Ministry of Fisheries Research Project LDO2004/01. NIWA, Wellington, New Zealand. 36 p.
- Andrews, A.H.** and D.M. Tracey. 2003. Age validation of deepwater fish species, with particular reference to New Zealand orange roughy, black oreo, smooth oreo, and black cardinalfish. Final Research Report for Ministry of Fisheries Research Project DEE2000/02 Objective 1. NIWA, Wellington, New Zealand. 24 p.
- Andrews, A.H.** 2002. Reliability assessment of season-of-capture determination for archaeological otoliths. *In: Prehistory at San Simeon Reef, Archaeological data recovery at CA-SLO-179 and -267, San Luis Obispo County, California*. Eds: T.L. Jones and J.A. Ferneau. San Luis Obispo Archaeological Society, Occasional Paper No. 16. pp. 429-446
- Andrews, A.H.** 2002. Preliminary radiometric ageing of the Pacific cod (*Gadus macrocephalus*). Final report to the Alaska Department of Fish and Game, Division of Commercial Fisheries, Juneau. ADFG contract: D.O. #11-J-108-02
- Andrews, A.H.**, E.J. Burton, K.H. Coale, and G.M. Cailliet. 1997. Radiometric age determination of the Atlantic sturgeon (*Acipenser oxyrinchus*): A feasibility study using pectoral fin rays. *In: Age structure and life history attributes of Atlantic sturgeon (Acipenser oxyrinchus) in the Hudson River*. Eds: D.H. Secor, J.T. Stevenson, and E.D. Houde. HRF Grant No. 006/93A. Report of The University of Maryland System, Center for Environmental and Estuarine Studies, Chesapeake Biological Laboratory to Hudson River Foundation, New York, New York, pp. 63-80
- Nybakken, J.M., G.M. Cailliet, L. Weetman, **A.H. Andrews**, E. Cordes, M. Jacobi, M.D. White, K. Johnson, E. Burton, and N. Laman. 1996. Ocean disposal site end point monitoring. Final Report for Navy CLEAN Contract #N62474-90-C-1147, MLML Technical Report 96-3, 37 p.
- Butler, J.L., C.R. Kastle, K. Rubin, D. Kline, H. Heijis, L. Jacobson, **A.H. Andrews**, and W.W. Wakefield. 1995. Age determination of the shortspine thornyhead using otolith sections and <sup>210</sup>Pb:<sup>226</sup>Ra ratios. SWFSC Admin. Rep. LJ-95-12, 22 p.
- Cailliet, G.M., W.W. Wakefield, G. Moreno, **A.H. Andrews**, and K. Rhodes. 1992. The deep-sea fish fauna from the proposed Navy Ocean Disposal Site, using trap, otter and beam trawl, and camera sled samples. Final Report on Navy CLEAN Contract #N62474-88-D-5086, MLML Technical Report, 69 p.

## Popular Articles and Reports

- Andrews, A.H.** 2020. A 25-Year Lifespan for *Ulua Aukea*. *Lawai'a Magazine* 32: xx-xx (In Press).
- Andrews, A.H.** 2020. Red fish, blue fish, old fish, new fish - Onaga can live half a century in the Hawaiian Islands. *Lawai'a Magazine* 31: 46-51.
- Andrews, A.H.** 2019. One of these fishes is not like the others - Hapu'upu'u has a long and complicated life history. *Lawai'a Magazine* 29: 36-39.
- Andrews, A.H.** 2017. Big blue was 20 years old. *Lawai'a Magazine* 25: 40-44.



- Yeman, C., **Andrews, A.H.**, Welte, C., Hattendorf, B., Wacker, L., Christl, M., and Synal, H.-A. 2016. How long can red snapper live? Revealing the bomb radiocarbon pulse in an otolith with LA-AMS. Annual Report 2016, Laboratory of Ion Beam Physics. ETH Zürich, Switzerland. p. 33.
- Andrews, A.H.**, Welte, C., Yeman, C., Wacker, L., Hattendorf, B., and Günther. 2015. Can red snapper live for half a century? Laser-ablation AMS reveals complete bomb <sup>14</sup>C signal in an otolith. Annual Report 2015, Laboratory of Ion Beam Physics. ETH Zürich, Switzerland. p. 39.
- Welte, C., Wacker, L., Hattendorf, B., Christl, M., **Andrews, A.H.**, Yeman, C., Synal, H.-A., Günther, D. 2015. Indirect radiocarbon dating of a pearl oyster: Rapid analysis of a marine carbonate sample by laser ablation AMS. Annual Report 2015, Laboratory of Ion Beam Physics. ETH Zürich, Switzerland. p. 38.
- Andrews, A.H.** 2013. Nuclear bombs and how long opakapaka can live. Bottomfish News. DAR Volume 15, March 2015. p. 5.

## Grants and contracts

- 2018-2019 **Naturhistoriska riksmuseet (Swedish Museum of Natural History)** – Collaboration with Swedish University of Agricultural Sciences, Department of Aquatic Resources (SLU Aqua) to use NordSIM-Vegacenter instrumentation. Could true winter zones in temperate eels (*Anguilla anguilla*) be distinguished from false annuli using oxygen-18 as a temperature key? (~65,000kr)
- 2018-2019 **NOSAMS Graduate Student Research Initiative (WHOI)** – Fostering graduate student of North Dakota State University. Can Bigmouth Buffalo Live 100 years? Age Validation by bomb radiocarbon dating. (\$10,000 with funded site visit)
- 2017-2019 **NOSAMS Graduate Student Internship Program (WHOI)** – Fostering graduate student of University of South Carolina. Age and longevity of oceanic whitetip shark, *Carcharhinus longimanus*, validated with bomb radiocarbon analysis. (\$60,000-90,000)
- 2017-2019 **CRP - NOAA Funding Opportunity Number: NOAA-NMFS-SE-2017-2004940** – Evaluating Age Structure and Foraging Ecology of Yellowfin and Bigeye Tuna in the Northwest Atlantic. (\$190,903)
- 2016-2017 **BBVA Foundation - Spain** – Conservation of gorgonian *Ellisella paraplexauroides* in Mediterranean: a unique relic of the Pleistocene. (€12,000)
- 2014-2016 **Saltonstall-Kennedy Grant Program** – Age-validated life history using bomb radiocarbon dating in support of Territorial Science and Bio-sampling of fisheries in Guam and the Commonwealth of the Northern Mariana Islands. (\$196,112)
- 2014-2016 **Information to Support and Conduct Stock Assessments - Science and Technology** – Small-vessel survey and auction sampling to estimate growth and maturity of eteline snappers and improve data-limited stock assessments. (\$73,520)
- 2014-2016 **Marine Fisheries Initiative - MARFIN** – Age validation for red snapper (*Lutjanus campechanus*) and gray snapper (*L. griseus*) using bomb radiocarbon dating. (\$45,050)
- 2014 **Awarded travel funding - personal and other NOAA employees** – Developed request with Richard McBride (NEFSC) to gain NOAA Science & Technology support for 5<sup>th</sup> International Otolith Symposium. (One representative per NOAA Center - \$55,000)
- 2011-2013 **Species of Concern Program - Office of Protected Resources** – Bomb radiocarbon dating to validate ages of humphead wrasse (*Cheilinus undulatus*) and bumphead parrotfish (*Bolbometopon muricatum*). (\$12,400); Age validation and maximum age of sand tiger shark (*Carcharias taurus*) by bomb radiocarbon analysis. (\$30,000); Age validation of Warsaw grouper (*Hyporthodus nigrilus*) and speckled hind (*Epinephelus drummondhayi*) using bomb radiocarbon dating. (\$35,000)
- 2010-2011 **California Sea Grant via Moss Landing Marine Laboratories** – Project Completion: Bomb radiocarbon dating of white abalone (*Haliotis sorensni*) using a Southern California Bright reference curve. (\$8,239)
- 2008-2009 **National Museum of Marine Biology and Aquarium, Taiwan** – Lead-radium dating of blue roughy (*Gephyroberyx japonicus*). (\$5,000)
- 2008 **4<sup>th</sup> International Deep Sea Coral Symposium, New Zealand** – Two travel grants to attend the meeting. (\$4,000)
- 2008 **National Institute of Water and Atmospheric Research, New Zealand** – Validation of age and growth of ribaldo (*Mora moro*). (\$6,500)
- 2008 **American Institute of Fisheries Research Biologists** – Travel grant to Rhodes University, South Africa. (\$500)
- 2007-2008 **National Institute of Water and Atmospheric Research, New Zealand** – Feasibility of lead-radium dating giant stargazer (*Kathetostoma giganteum*). (\$15,000)
- 2007-2008 **NOAA Fisheries, Auke Bay Laboratory** – Lead-210 dating of Gulf of Alaska deep-sea corals. (\$45,000)
- 2007-2008 **NOAA Fisheries, Southeast Fisheries Science Center, Panama City Lab** – Lead-radium dating of golden tilefish (*Lopholatilus chamaeleonticeps*). (\$51,696)
- 2007-2008 **National Institute of Water and Atmospheric Research, New Zealand** – Testing the feasibility of lead-radium dating on otoliths of lookdown dory (*Cyttus traversi*). (\$13,000)

- 2006-2008 **California Sea Grant R/F-202** – Red (*Haliotis rufescens*) and white abalone (*H. sorenseni*) age and growth using the bomb radiocarbon & lead-210 dating. (\$222,531)
- 2006-2007 **National Institute of Water and Atmospheric Research, New Zealand** – Lead-radium dating of blue mackerel. (\$14,000)
- 2006 **Tetra Tech, Inc., Lafayette, California** – Thailand tropical fishes: Age and growth investigations. (\$22,956)
- 2005-2007 **National Institute of Water and Atmospheric Research, New Zealand** – Age validation of New Zealand deepwater fishes. (\$66,050)
- 2005-2007 **Department of Commerce: Office of Ocean Exploration** – Bamboo coral of Davidson Seamount: Age and growth investigations. (\$39,000)
- 2005 **California Sea Grant R/F-110PD** – Age validation of the cowcod (*Sebastes levis*): Completion of R/F-190. (\$7,094)
- 2004-2005 **National Institute of Water and Atmospheric Research, New Zealand** – Bamboo coral of New Zealand: Age and growth investigations. (\$15,061)
- 2004 **California Sea Grant R/F-100PD** – Travel support to attend 3<sup>rd</sup> International Otolith Symposium. Presentation and publication of Sea Grant Research. Travel and conference expenses for two people (myself and Gregor Cailliet). (\$8,366)
- 2003-2006 **National Science Foundation** – Radiometric age validation studies of the Patagonian and Antarctic toothfishes (*Dissostichus eleginoides* and *D. mawsoni*). (\$356,000)
- 2002-2004 **California Sea Grant R/F-190 and Lawrence Livermore National Laboratory** – Bomb carbon in the yelloweye rockfish, *Sebastes ruberrimus*, as a chronological benchmark for age validation of commercially important fishes. (\$149,142, including one traineeship (\$33,816) and CAMS \$50,000 processing)
- 2002-2003 **National Institute of Water and Atmospheric Research, New Zealand** – Feasibility study to obtain radiometric age estimates of deepwater fishes. (\$22,050)
- 2002-2003 **Monterey Bay National Marine Sanctuary** – Age and growth determination of deep-sea corals from the Davidson Seamount. (\$24,000)
- 2002 **National Science Foundation** – Acquisition of a high-resolution inductively coupled plasma mass spectrometer. (Partial funding)
- 2002 **Alaska Department of Fish and Game** – Preliminary radiometric ageing of the Pacific cod (*Gadus macrocephalus*). (\$7,500)
- 2001-2003 **California Sea Grant R/F-182** – Radiometric age validation and demographic analysis of commercially important, long-lived rockfishes. (\$130,711, including traineeship (\$33,480))
- 2001 **California Sea Grant R/F-66PD** – Travel support for the 6<sup>th</sup> Indo-Pacific Fish Conference: Presentation and Publication of Sea Grant Research. Travel and conference expenses for two people (myself and Gregor Cailliet). (\$6,500)
- 2000-2001 **California Sea Grant R/F-176** – Radiometric age validation of two deep-water fishes: the yelloweye (*Sebastes ruberrimus*) and blackgill (*S. melanostomus*) rockfishes. (\$61,402, including traineeship (\$16,248))
- 1999-2001 **North Pacific Marine Research Initiative: USGS via University of Alaska, Fairbanks** – Age and growth of two deep-sea, habitat-forming octocorallian corals of the Gulf of Alaska and Bering Sea, with radiometric age validation and climate correlation. (\$89,502, including one traineeship (\$5,200))
- 1998-1999 **California Sea Grant R/F-174** – Application of radiometric age determination to the bocaccio rockfish, *Sebastes paucispinis*. (\$40,000, including traineeship (\$15,168))
- 1998 **California Department of Transportation (Caltrans)** – Archaeological investigations at CA-SLO-179 and CA-SLO-267 pursuant to the stipulations of Contract 55004863 between California Polytechnic State University, San Luis Obispo and Caltrans. (\$2000)
- 1994 **PADI Foundation Grant** – Age and growth of the spotted sand bass (*Paralabrax maculatofasciatus*) in Bahia de Los Angeles, Mexico. (\$1500)
- 1994 **Dr. Earl H. and Ethyl M. Myers Oceanographic and Marine Biology Trust** – Age and growth of the spotted sand bass (*Paralabrax maculatofasciatus*) in Bahia de Los Angeles, Mexico. (\$500)
- 1993 **Travel grant from Dr. J.H. Martin (MLML)** – First International Otolith Symposium, Hilton Head, South Carolina. (\$500)

### Leadership, Consultancy and Recognition

- 2020 LECTURER – Scripps Institute of Oceanography – Current Research in Marine Biology (SIO139): “The latest in bomb radiocarbon dating and its potential applications in fisheries of Sweden” (<https://youtu.be/u0TWn6NIDYk>) – Class Instructor used my online seminar for class teaching
- 2019 CORRESPONDENT – Minnesota Department of Natural Resources: Conference call on management status of Bigmouth Buffalo in Minnesota

- 2019 LEAD COLLABORATOR – Laser-ablation and gas-AMS in the Ion Beam Physics Lab on a 2-week site visit to ETH University, Zurich, Switzerland
- 2017-2018 SCIENTIFIC STEERING COMMITTEE & SESSION CHAIR – 6<sup>th</sup> International Otolith Symposium, Taiwan
- 2017 SCIENTIFIC STEERING COMMITTEE – 2<sup>nd</sup> International Radiocarbon in the Environment Conference, Debrecen, Hungary
- 2016 OUTSTANDING REVIEWER with *Fisheries Research* – Awarded recognition for being within the top 10<sup>th</sup> percentile of reviewers in the last two years.
- 2015-2017 DEEP SEA VIDEO AND COLLECTION SCIENTIST for the *Okeanos Explorer Expeditions* – Remote assistance with identification of deep-sea fishes and collection of invertebrates (deep sea corals).  
 – Howland and Baker Unit of the Pacific Remote Islands Marine National Monument and the Phoenix Islands Protected Area  
 – Mariana Trench National Marine Monument  
 – Papahānaumokuākea Marine National Monument
- 2015 OTOLITH AGE AND GROWTH WORKSHOP – Provided a workshop on the use of otolith sectioning and age-reading techniques to technicians in an endeavor to build regional capacity in life history studies of regional fishes.  
 – Guam - *University of Guam, Guam Fishermen's Cooperative Association & NOAA Fisheries, Guam*  
 – Saipan - *Micronesian Environmental Services & Department of Fisheries and Wildlife, Saipan*
- 2014 OUTSTANDING REVIEWER with *Canadian Journal of Fisheries and Aquatic Sciences* – Awarded recognition for consistent and expeditious reviews.
- 2013-2014 SCIENTIFIC ORGANIZING COMMITTEE – 1<sup>st</sup> International Radiocarbon in the Environment Conference, Belfast, Ireland  
 Organized and led a special session: "Bomb Radiocarbon Dating of Marine Organisms: Research and Application"
- 2013-2014 WORKSHOP COMMITTEE & SESSION CHAIR – Age Validation Workshop, 5<sup>th</sup> International Otolith Symposium, Palma, Mallorca, Spain
- 2013 DIRECTED RESEARCH PROJECT ADVISOR – University of Hawaii undergraduate student: Age and reproduction of gindai (*Pristipomoides zonatus*)
- 2010-*nunc* FISHBASE COLLABORATOR – Assistance with information updates and corrections ([www.fishbase.com](http://www.fishbase.com))
- 2010-2018 EDUCATIONAL VOLUNTEER – Hanauma Bay Educational Program under Hawaii Sea Grant
- 2009-2019 CONSULTANT (NOAA FISHERIES) – Solicited advice provided in area of expertise while working under at the PIFSC  
*Bomb radiocarbon dating feasibility consultations:*  
 Sleeper shark (AFSC and ADFG) – Age calibration of Maui coral record (USGS, UC Santa Cruz) – Australian lungfish (Department of Natural Resources and Mines, Queensland) – Coral age and growth timelines and references on Oahu (Hawaii Pacific University, Hokkaido University) – Black coral age validation of Madagascar (University of Mons, Biosciences Institute, Belgium) – Deep-water fishes and black coral of Mediterranean (National Concilium of Research, Sicily, Italy) – Thornyhead rockfishes (Alaska Department of Fish and Game) – Thresher shark of Northwestern Atlantic (Apex Predator Program, NEFSC) – Freshwater drum and lake sturgeon (Northeast Fishery Center, US Fish and Wildlife Service) – Northwestern Pacific <sup>14</sup>C records and variability across regions (AFSC) – Great Barrier Reef  $\Delta^{14}\text{C}$  records and bottomfishes (James Cook University) – Great white, whale, basking and dusky shark age validation (NEFSC and WHOI) – Red bream  $\Delta^{14}\text{C}$  interpretation (Grice Laboratory, College of Charleston, SC) – Smalltooth sawfish (SEFSC-Panama City Lab) – Deep-sea sharks (James Cook University) – Indo-Pacific fishes (Western Australian Fisheries and Marine Research Laboratories) – Greenspotted and bronzespotted rockfishes (SWFSC – Santa Cruz Lab)  
*Lead-radium dating feasibility consultations:*  
 Antarctic icefishes (Scientific Committee on Antarctic Research) – Deep-sea grenadier (University of Hawaii) – Black scabbardfish (University College Cork, Ireland and Directorate of Fisheries Research, Portugal) – Allis shad (Center of Marine and Environmental Research, Portugal)  
*Age estimation consultations:*  
 Lancetfish (Oceanography Department, University of Hawaii, Manoa) – Pacific sleeper shark of Alaska (University of Alaska, Fairbanks) – Various Gulf of Mexico snapper and grouper species (Panama City Lab, SEFSC) – Black coral in Gulf of Alaska (AFSC and Smithsonian) – Parrotfishes (Scripps Institute of Oceanography) – Patagonian and Antarctic toothfishes (CCAMLR Otolith Network) – Monchong (University of Hawaii) – Deep-sea coral (Hawaii Pacific University)
- 2009-2019 NORTH PACIFIC RESEARCH BOARD – Peer reviewer of research proposals to the NPRB ([www.nprb.org](http://www.nprb.org))
- 2008-2009 COMMITTEE MEMBER – Trans-Atlantic Coral Ecosystem Study (TRACES Science Plan). Investigation of the biodiversity, connectivity and climate records associated with cold-water coral habitats in the North Atlantic Ocean (Multi-agency, International)
- 2007-2009 CONSULTANT – Astronomical Guide for Monterey Peninsula College with hands-on operation of 30-inch telescope (Fremont Peak Observatory)
- 2007 CONSULTANT – Lead-210 dating of chimney structures of deep-sea hydrothermal vents (University of Hawaii)
- 2006-2009 COMMITTEE MEMBER and CONFERENCE ORGANIZER – 4<sup>th</sup> International Otolith Symposium, Monterey, California. Session Chair.  
 Note: **I designed the 4<sup>th</sup> IOS Logo**
- 2006 PROJECT RADIOCHEMIST – Davidson Seamount: Exploring Ancient Coral Gardens (Department of Commerce: Office of Ocean Exploration)
- 2006 CONSULTANT – Contribution to NOAA Technical Memorandum CRCP-3, The State of Deep Coral Ecosystems of the United States: 2007
- 2006 CONSULTANT – Thailand tropical fishes: Age and growth investigations. (Tetra Tech, Inc., Lafayette, CA, Sub-consultant Agreement No. PO 025864)
- 2002-2006 CONSULTANT – Alaska Department of Fish and Game

- Feasibility of lead-radium dating Pacific cod (*Gadus macrocephalus*) & Bomb radiocarbon dating of shortspine thornyhead (*Sebastolobus alascanus*)
- 2002-2004 INTERNATIONAL COMMITTEE MEMBER and CONFERENCE ORGANIZER - Third International Otolith Symposium, Townsville, Queensland, Australia.  
Member of the International Scientific Organizing Committee.  
Session Chair for the Age and Growth Estimation and Validation session and selected for organizing committee of 2009 meeting in Monterey, CA.
- 1999-2000 CONSULTANT – Southern Cross: Monterey Bay Fiber Optic Cable Landing Project (ABA Consultants for MCI Worldcom)
- 1999-2000 CONSULTANT – Demonstration for Diablo Canyon Power Plant 316(b) Report (Tenera Environmental Services, Inc. for Pacific Gas and Electric Co.)
- 1998-1999 CONSULTANT – Sharing details of improved radiometric ageing technique (AFSC)

## Public presentations and meetings

### **2020**

- CSIRO/SPC - Bomb radiocarbon age validation workshop for tuna and billfish in the WCPO – Guiding participant with three presentations (1-2 July)  
"Introduction to bomb radiocarbon age validation and available <sup>14</sup>C records in the Pacific"  
"Pacific blue marlin (*Makaira nigricans*) longevity estimates confirmed with bomb radiocarbon dating"  
"Age validation of yellowfin (*Thunnus albacares*) and bigeye (*Thunnus obesus*) tuna of the northwestern Atlantic Ocean"
- Swedish University of Agricultural Sciences (Sveriges lantbruksuniversitet) – Guest speaker seminar  
"The latest in bomb radiocarbon dating and its potential applications in fisheries of Sweden" (<https://youtu.be/u0TWN6NIDYk>)
- 135<sup>th</sup> Scientific and Statistical Committee meeting – Honolulu, Hawaii  
"Validated age and growth of yellowfin (*Thunnus albacares*) and bigeye (*Thunnus obesus*) tuna of the northwestern Atlantic Ocean"

### **2019**

- ICCAT Yellowfin Tuna Preparatory Meeting (Madrid, Spain) - Provided data and presentational slide information
- ICCAT Yellowfin Stock Assessment Meeting (July 2019 Grand-Bassan) - Provided data and presentational slide information
- WCPFC 15th Regular Session of the Scientific Committee (August 2019 Pohnpei, Micronesia) - Provided data and presentational slide information
- 70th Tuna Conference – Lake Arrowhead, California  
"Validated longevity of yellowfin (*Thunnus albacares*) and bigeye (*T. obesus*) tuna"
- Fishers Forum, Honolulu, Hawaii – Guest speaker "Bombs and Fish"
- Woods Hole Oceanographic Institution – Seminar "Bombs and Blue Marlin - Coral, Otoliths, Seawater, and Future Directions"

### **2018**

- Havsiskelaboratoriet, Sveriges lantbruksuniversitet (Institute of Marine Research), Lysekil, Sweden – Guest speaker seminar  
"Bombs and blue marlin (*Makaira nigricans*) – confirmation of rapid growth and longevity" &  
"Laser ablation AMS reveals complete bomb <sup>14</sup>C record in an otolith with confirmation of 60-year longevity for red snapper"
- 6<sup>th</sup> International Otolith Symposium – Taiwan  
"Laser ablation AMS reveals complete bomb <sup>14</sup>C record in an otolith with confirmation of 60-year longevity for red snapper"
- Moss Landing Marine Laboratories – Seminar Series  
"Bombs and blue marlin (*Makaira nigricans*) – confirmation of rapid growth and longevity" (YouTube: <https://youtu.be/Jf0iAYPcx9g>)

### **2017**

- CalCOFI Conference 2017  
"Bombs and blue marlin (*Makaira nigricans*) – Confirmation of very rapid growth"  
"Can red snapper live for half a century? Laser-ablation AMS reveals complete bomb radiocarbon signal in an otolith"
- University of Hawaii, Manoa - Seminar  
"Bombs and blue marlin (*Makaira nigricans*) – Confirmation of very rapid growth"
- Hawaii Pacific University Marine Science Seminar  
"Bombs and blue marlin (*Makaira nigricans*) – Confirmation of very rapid growth"
- 14<sup>th</sup> International AMS Conference – Ottawa, Canada  
"Can red snapper live for half a century? Laser-ablation AMS reveals complete bomb radiocarbon signal in an otolith"  
(Senior authored paper presented by ETH Zurich student)
- Theater Thursday – Hanauma Bay Seminar Series  
"Bombs and blue marlin (*Makaira nigricans*) – Confirmation of very rapid growth" (Online: <https://youtu.be/F7pc0YLh7p8>)
- 2<sup>nd</sup> International Radiocarbon in the Environment Conference – Debrecen, Hungary  
1) "Can red snapper live for half a century? Laser-ablation AMS reveals complete bomb <sup>14</sup>C signal in an otolith"  
2) "Black coral age and growth validation using <sup>14</sup>C dating in the central Mediterranean Sea" (poster)

Seminar for Inouye Regional Center Seminar Series at IRC, Honolulu, Hawaii

"Bombs and blue marlin (*Makaira nigricans*) – Confirmation of longevity estimates using bomb radiocarbon dating"

68<sup>th</sup> Tuna Conference – Lake Arrowhead, California

"Bombs and blue marlin (*Makaira nigricans*) – confirmation of rapid growth"

Seminar for Scientific Committee on Research meeting (SCoR) – PIFSC, Honolulu, Hawaii

"Can red snapper & Hawaiian grouper live more than half a century? Laser-ablation AMS reveals complete bomb radiocarbon signal in an otolith"

Deutsche Physikalische Gesellschaft (German Physical Society) – Hanover, Germany

"Improvements of the Laser Ablation Interface for Direct <sup>14</sup>C – AMS analysis of carbonates" (coauthor)

Big Bend Science Symposium – University of Florida, Cedar Key, Florida

"Otolith radiocarbon verifies age estimates in long-lived reef fishes along the west Florida shelf" (coauthor)

Seminar at Southwest Fisheries Science Center, Santa Cruz Lab – Santa Cruz, California

"Bombs and blue marlin (*Makaira nigricans*) – confirmation of rapid growth"

## 2016

AGU Fall Meeting – San Francisco, California

"Nuclear bombs and coral: Guam coral core reveals operation-specific radiocarbon signals from the Pacific Proving Grounds" (poster)

North Pacific Marine Science Organization 2016 Annual Meeting (25 years of PICES) – San Diego, California

"Nuclear bombs and coral: Guam coral core reveals operation-specific radiocarbon signals from the Pacific Proving Grounds" at MEQ Workshop (W10):  
*Distribution and risk analysis of radionuclides in the North Pacific* (Invited speaker & regular meeting poster)

Marine Biology Graduate Program Seminar Series – University of Hawaii, Manoa

"Nuclear bombs and coral: Guam coral core reveals operation-specific radiocarbon signals from the Pacific Proving Grounds"

ICES Annual Science Conference – Riga, Latvia

"Reconstructing environmental history off Sicily with bomb radiocarbon validated trace element analysis in otoliths of *Dentex gibbosus*" (coauthor)

4<sup>th</sup> International Sclerochronology Conference – Portland, Maine

"Continuous <sup>14</sup>C analysis of marine carbonates by laser ablation coupled with AMS" (poster coauthor)

13<sup>th</sup> International Coral Reef Symposium – Honolulu, Hawaii

"Nuclear bombs and coral: Guam coral core reveals operation-specific radiocarbon signals from the Pacific Proving Grounds" (poster)

12<sup>th</sup> European Conference on Accelerators in Applied Research and Technology Conference

"Laser Ablation – AMS: rapid and spatially resolved radiocarbon analyses of carbonate archives" (poster coauthor)

## 2015

Radiocarbon 2015 – Dakar, Senegal

"Rapid high resolution <sup>14</sup>C-analysis of carbonate records by laser ablation" (poster coauthor)

Otolith Age Estimation and Validation Workshops (1 week each) with Seminars

Saipan workshop – Micronesia Environmental Services (host) and Department of Fish and Wildlife  
Public Seminar at Joeten-Kiyu Public Library

Guam workshop – University of Guam (host), PIFSC-Guam, Guam Fishermen's Cooperative, DAWR, WPRFMC  
Technical Seminar at University of Guam & Public Seminar at Guam Fishermen's Cooperative

Guest Speaker at Swedish University of Agricultural Sciences, Department of Aquatic Resources, Drottningholm, Sweden.

"Bomb radiocarbon dating of fishes"

National Concilium of Research, Mazara del Vallo, Sicily, Italy (1-week collaboration visit)

Public seminar – "Bombs and Fish- How nuclear explosions can tell us about the age of fishes"

Technical seminar – "Bomb radiocarbon dating of European hake (*Merluccius merluccius*)"

ETH University, Zurich, Switzerland (1-week collaboration visit)

Technical seminar – "Bombs and Fish - How nuclear explosions can tell us about the age of fishes"

Joint Meeting of Ichthyologists and Herpetologists – Reno, Nevada

"Maximum age and missing time in shark vertebrae: limits and validity of age estimates using bomb radiocarbon dating"

Hanauma Bay Education Program: Sundays at the Bay - Science and the Open Ocean - Outreach Talk #2

"Bombs and fish – How nuclear explosions can tell us about the age of fishes"

Note: Presentation was broadcast on YouTube: <https://youtu.be/lZ9VzB0lw3Y>

CNMI Research Workshop on Reef Fish and Bottomfish & Guam Insular Fish Research Workshop

"Age Validation of Bottom and Reef Fishes - Hawaii & Western Central Pacific" (2x oral presented by colleague)

Class presentation – Marine Biology 691 Graduate seminar - "Meet the professors"

Marine Biology 404 – Seminar for Advanced Topics in Marine Biology

"Bombs and fish – How nuclear explosions can tell us about the age of fishes"

Hawaii State Science and Engineering Fair - Hawaii Convention Center

NOAA Careers – Short introductions about science and my career path to 6-8 groups of high school kids

## 2014

Seminar at Hawaii Institute of Marine Biology – Kaneohe Bay, Oahu

"Maximum age and missing time in shark vertebrae: limits and validity of age estimates using bomb radiocarbon dating"

Center for Independent Experts panel review – Stock Assessment Update for the Main Hawaiian Islands Deep7 Bottomfish Complex Through 2013 With Projected Annual Catch Limits Through 2016

"Age and Growth of Bottomfishes – Hawaii & Western Central Pacific" (oral)

NMFS Science & Technology Board – Program Review (**One of four PIFSC presenters selected for this forum**)

"Age, growth and longevity of managed marine species" (oral)

SEFSC-Panama City Lab – Orientation seminar

"Bomb radiocarbon dating of marine organisms – Research and application"

Inouye Regional Center Science Seminar – Honolulu, Hawaii

"Maximum age and missing time in shark vertebrae: the limits and validity of bomb radiocarbon dating" (oral)

5<sup>th</sup> International Otolith Symposium – Mallorca, Spain

Workshop Organizer/Convener – Workshop on Age Validation

1) "Refined bomb radiocarbon dating of two iconic fishes of the Great Barrier Reef" (oral)

2) "How long is the lifespan of European hake in the Mediterranean?" (coauthor)

1<sup>st</sup> Radiocarbon in the Environment Conference – Belfast, Ireland

Session organizer/Convener – Bomb Radiocarbon Dating of Marine Organisms: Research and Application

"Bomb radiocarbon dating of marine organisms: research and application" (**Keynote speaker for the session**)

Autumn meeting of the Japanese Society of Fisheries Science – Kyushu University, Fukuoka, Japan

"Lead-radium dating of Darwin's slimehead *Gephyroberyx darwinii* (Beryciformes, Trachichthyidae)" (oral by coauthor)

Tsumkwe Junior Secondary School – Tsumkwe, Namibia

Guest speaker for Biology Classes (grades 9-12) – "Age and growth of fishes"

Sharks International – Durban, South Africa

1) "Maximum age and missing time in shark vertebrae: the limits and validity of age estimates using bomb radiocarbon dating" (oral)

2) "Validated lifespan of sand tiger shark *Carcharias taurus* from bomb radiocarbon dating in the western North Atlantic and southwestern Indian Oceans" (coauthor)

Seminars to Oceanography Department (6/2014) and Graduate Marine Biology Program (9/2014) at University of Hawaii – Presentation for consideration in joining each department as an Affiliate Faculty member (accepted to each)

"Maximum age and missing time in shark vertebrae: the limits and validity of bomb radiocarbon dating" (oral)

National Shellfisheries Association (107<sup>th</sup> Annual Meeting) – Monterey, California

"Bomb radiocarbon dating of the endangered white abalone (*Haliotis sorenseni*): investigations of age, growth and lifespan" (oral by coauthor)

Seminar on shark age and growth – Hawaii Pacific University

"Maximum age and missing time in shark vertebrae: the limits and validity of bomb radiocarbon dating" (oral)

Seminar on age and growth of abalone – Hawaiian Malacological Society

"Bomb radiocarbon dating of white abalone (*Haliotis sorenseni*): investigations of age, growth and lifespan" (oral)

## 2013

American Geophysical Union – San Francisco, California

"Concurrent Sr/Ca Ratios and bomb test <sup>14</sup>C records from a *Porites lobata* colony on Kure Atoll: SST, climate change, ocean circulation and management applications" (poster coauthor)

Seminar to research faculty and students – University of the Ryukyus, Okinawa, Japan

"Red fish, blue fish – Old fish, new fish. Why do we care about how long fish live?" (oral)

Hanauma Bay Volunteer Program Training and Staff – Hanauma Bay, Oahu (April and October 2013)

"Life Histories of the fishes of Hanauma Bay." (oral)

157<sup>th</sup> Council Meeting – Western Pacific Regional Fishery Management Council – Honolulu, Hawaii.

"Age-Validated Life Histories of Bottom and Reef fishes: Hawaii and the Western Pacific." (oral)  
113<sup>th</sup> Meeting of the Scientific and Statistical Committee – Honolulu, Hawaii.

"Age-Validated Life Histories of Bottomfish: Hawaii and the Western Pacific." (oral)  
Bottomfish Research Coordination Workshop – Honolulu, Hawaii.

"Life History Program Studies of Deep-slope Bottomfish Species." (co-presenter)

## 2012

Special Committee on Research (SCOR) meeting.

"Age and ecological data from hawksbill sea turtle shell." (co-presenter)

El Encuentro Colombiano sobre Condriactos (Colombian Meeting on Chondrichthyans)

"Age-validated longevity of deep-sea and chondrichthyan fishes: Its importance for sustainable fisheries" (coauthor)

Hanauma Bay Seminar.

"Red fish, blue fish - Old fish, new fish. How old fish get and why you should care."

American Elasmobranch Society – Minneapolis, Minnesota.

"Age validation in sand tiger shark, *Carcharias taurus*, using bomb radiocarbon analysis." (coauthor)

Hawaiian Islands Symposium.

"Bomb radiocarbon dating of opakapaka (*Pristipomoides filamentosus*) and a long-lived life history." (oral)

SEFSC-Panama City Lab: Orientation seminar.

"The Latest on Fish and Bombs"

Scientific Committee on Antarctic Research meeting – Portland, Oregon.

"Does large-scale circulation structure life history connectivity in Antarctic toothfish (*Dissostichus mawsoni*)?" (coauthor)

## 2011

American Fisheries Society – Seattle, Washington.

"Bomb radiocarbon dating of opakapaka (*Pristipomoides filamentosus*) and a long-lived life history." (oral)

152<sup>nd</sup> Meeting of the Western Pacific Regional Fishery Management Council.

"Bomb radiocarbon dating of opakapaka (*Pristipomoides filamentosus*) and a long-lived life history." (oral)

SEFSC-Panama City Lab: Orientation Seminar.

"Lead-radium and bomb radiocarbon dating: Determination of age, growth and lifespan of marine fishes and invertebrates."

Hawaii Institute of Marine Biology Seminar.

"Bomb radiocarbon dating of fish: How long fish live and why you should care."

## 2010

Hanauma Bay Education Program Seminar.

"Fishes and their living habitat: How the "garden" grows and why you should care."

Hawaii Pacific University Seminar.

"Bomb radiocarbon dating of fish: How long fish live and why you should care."

American Society of Ichthyologist and Herpetologists – Providence, Rhode Island.

"A long-lived life history for opakapaka (*Pristipomoides filamentosus*) based on lead-radium and bomb radiocarbon dating." (oral)

Special Committee on Research (SCOR) meeting.

"Application of radioisotope-based methods to age long-lived fishes: Opakapaka (*Pristipomoides filamentosus*) as a case study for Hawaii." (oral)

## 2009

Species of Concern Workshop (Department of Protected Resources) – Seattle, Washington.

1) "Bomb radiocarbon dating of white abalone (*Haliotis sorenseni*): investigations of age, growth and lifespan." (oral)

2) "Lead-radium dating of marine fishes: Preliminary findings for Pacific cod." (oral)

4<sup>th</sup> International Otolith Symposium – Monterey, California.

1) "A long-lived life history for opakapaka based on lead-radium and bomb radiocarbon dating." (**Keynote Speaker**)

2) "Bomb radiocarbon dating of white abalone (*Haliotis sorenseni*): investigations of age, growth and lifespan." (oral)

3) "Validation of growth zone deposition in the golden tilefish (*Lopholatilus chamaeleonticeps*) using lead-radium dating." (coauthor - poster)

American Cetacean Society Seminar – Hopkins Marine Station.

"Fishes and their living habitat: How the garden grows."

ICES Deep Sea Symposium – Azores, Portugal.

"Lead-radium and bomb radiocarbon dating: Age validation of Patagonian toothfish (*Dissostichus eleginoides*), orange roughy (*Hoplostethus atlanticus*), and cowcod (*Sebastes levis*)." (oral)

Department of Oceans, University of Azores, Portugal. Seminar.

"Age, growth and lifespan of fishes and their living habitat."

Radiocarbon 2009 – Kona, Hawaii.

"Bomb radiocarbon dating of white abalone (*Haliotis sorenseni*): investigations of age, growth and lifespan." (oral)

Monterey Bay Aquarium Research Institute – Moss Landing, California.

"Lead-radium and bomb radiocarbon dating: Determination of age, growth & lifespan of marine fishes & invertebrates"

Pacific Grove Museum. Deep Sea Public Lecture Series: An In-Depth Look at Ocean Exploration – Pacific Grove, California.

"Fishes and their living habitat: How the garden grows and why you should care."

Sanctuary Currents – Monterey, California.

"Age and Growth of Three Bamboo Coral Species from the Northeastern Pacific Ocean" (poster)

## 2008

4<sup>th</sup> International Deep Sea Coral Symposium - Wellington, New Zealand.

"Age and growth of three bamboo coral species from the northeastern Pacific Ocean." (poster)

Western Groundfish Conference - Santa Cruz, California.

"Lead-radium dating of two deep-water fishes from the southern hemisphere, Patagonian toothfish (*Dissostichus eleginoides*) and orange roughy (*Hoplostethus atlanticus*)." (oral)

California State University, Monterey Bay. Seminar.

"Fishes and their living habitat: How the garden grows and why you should care."

Monterey Peninsula College – Gentrain Society Seminar.

"Fishes and their living habitat: How the garden grows and why you should care."

World Fisheries Congress – Yokohama, Japan.

"Age-validated longevity of fishes: Its importance for sustainable fisheries." (coauthor)

Symposium on Chondrichthyans (& Deep-sea) Fishes – National Kaohsiung Marine University, Taiwan.

"Advances in Age Validation for Understanding the Life Histories of Chondrichthyan & Deep-sea Fishes." (coauthor)

## 2007

National Institute of Water and Atmospheric Research – Wellington, New Zealand.

Invited speaker on radiometric age validation of orange roughy and black cardinalfish.

American Fisheries Society – San Francisco, California.

"Age estimation and lead-radium dating of Antarctic toothfish." (coauthor)

Turning Point Educational Program (2 seminars) – Salinas, California.

Guest speaker for teenage kids on probation.

Santa Catalina School – Monterey, California.

Guest speaker for elementary and middle school classes (3-4<sup>th</sup> grade and 5-6<sup>th</sup> grade science)

## 2006

Graduate Seminar Week at Rhodes University – Grahamstown, South Africa.

"Lead-radium dating of the Patagonian toothfish (*Dissostichus eleginoides*)." **Best Ph.D. Student Paper Award**

American Society of Limnology and Oceanography Conference - Victoria, British Columbia, Canada.

"Historic atmospheric Hg deposition in California: An assessment of pre-anthropogenic flux." (coauthor)

Moss Landing Marine Labs Open House – Guest speaker seminar.

Kiwanis Club – Monterey, California – Guest speaker luncheon.

## 2005

3<sup>rd</sup> International Symposium on Deep-Sea Corals: Science and Management - Miami, Florida.

1) "Lead-210 dating bamboo coral (family Isididae) of New Zealand and California." (oral)

2) "Age and growth, and age validation of deep-sea coral family Isididae." (coauthor)

3) "Preliminary evidence of oceanic climate change around New Zealand over the last century: the pole-equator seesaw." (coauthor)

Rhodes University, Department of Ichthyology and Fisheries Science – Grahamstown, South Africa.

Guest Lecture. "Fishes and their living habitat: how the 'garden' grows." (oral)

American Society of Ichthyologists and Herpetologists – Tampa Bay, Florida.



- 1) "Application of bomb radiocarbon chronologies to shortfin mako (*Isurus oxyrinchus*) age validation." (coauthor)  
 2) "Investigations of  $\Delta^{14}\text{C}$ ,  $\delta^{15}\text{n}$ , and  $\delta^{13}\text{c}$  in vertebrae of white shark (*Carcharodon carcharias*) from the eastern Pacific." (coauthor)  
 American Fisheries Society. Biology, Assessment, and Management of Pacific Rockfishes – Anchorage, Alaska.  
 "Validation of cowcod rockfish age using the bomb radiocarbon signal" (coauthor)  
 13<sup>th</sup> Western Groundfish Conference – Victoria, British Columbia, Canada.  
 "Age validation of the canary rockfish (*Sebastes pinniger*) from the northeastern Pacific Ocean using  $^{210}\text{Pb}$ : $^{226}\text{Ra}$  disequilibria and bomb  $^{14}\text{C}$ ." (oral)
- 2004**  
 3<sup>rd</sup> International Symposium on Fish Otolith Research and Application - Townsville, Queensland, Australia.  
 1) "Age validation of the canary (*Sebastes pinniger*) and bocaccio (*S. paucispinis*) rockfishes from the NE Pacific Ocean using bomb  $^{14}\text{C}$ ." (oral)  
 2) "Investigations of  $\Delta^{14}\text{C}$ ,  $\delta^{15}\text{n}$ , and  $\delta^{13}\text{c}$  in the white shark (*Carcharodon carcharias*) from the eastern Pacific Ocean." (coauthor)  
 3) "Age determination and validation: application, structures, methods, and analyses." (Keynote address; coauthor)  
 13<sup>th</sup> Western Groundfish Conference – Victoria, British Columbia, Canada.  
 "Age validation of the canary rockfish (*Sebastes pinniger*) from the northeastern Pacific Ocean using  $^{210}\text{Pb}$ : $^{226}\text{Ra}$  disequilibria and bomb  $^{14}\text{C}$ ." (oral)
- 2003**  
 Deep Sea 2003 Conference and Pre-conference Workshop – Dunedin and Queenstown, New Zealand.  
 1) "Radiometric age validation of long-lived fishes." (oral)  
 2) "How old are these deep-sea species?" (poster)  
 Moss Landing Marine Labs Friday Seminar Series.  
 "Fish and fisheries habitat: How the garden grows and why you should care."  
 2<sup>nd</sup> International Symposium on Deep Sea Corals – Erlangen, Germany.  
 "Determining the age and growth of three species of deep-sea coral from Davidson Seamount." (oral)  
 American Fisheries Society – Quebec City, Quebec, Canada.  
 "Radiometric age validation of long-lived fishes." (oral)  
 American Society of Ichthyologists and Herpetologists – Manaus, Brazil.  
 "Radiometric age validation of the canary rockfish (*Sebastes pinniger*) from the northeastern Pacific Ocean using both the disequilibria of lead-210 and radium-226 and the bomb radiocarbon chronology." (oral)  
 National Institute of Water and Atmospheric Research – Wellington, New Zealand – Invited speaker.  
 1) "General presentation on radiometric age validation of deep-water fishes presented to public." (oral)  
 2) "Presentation of report findings to Ministry of Fisheries board of advisors." (oral)
- 2002**  
 12<sup>th</sup> Western Groundfish Conference – Ocean Shores, Washington.  
 1) "Radiometric age validation of the yelloweye rockfish (*Sebastes ruberrimus*) from southeastern Alaska." (oral)  
 2) "Bomb carbon in yelloweye rockfish (*Sebastes ruberrimus*) otoliths as a chronological benchmark for age validation of rockfishes." (poster)  
 3) "Age and growth and radiometric validation of a deep-sea, habitat forming gorgonian (*Primnoa resedaeformis*) from the Gulf of Alaska." (poster)
- 2001**  
 6<sup>th</sup> Indo-Pacific Fish Conference – Durban, South Africa.  
 1) "Radiometric age determination of deep-sea fishes." (oral)  
 2) "Radiometric age validation of the bocaccio rockfish, *Sebastes paucispinis*." (poster)  
 Sanctuary Currents, Monterey Bay National Marine Sanctuary Symposium – Monterey, California.  
 1) "Radiometric age validation of the bocaccio rockfish, *Sebastes paucispinis*." (poster)  
 2) "Age and growth and radiometric validation of a deep-sea, habitat forming gorgonian (*Primnoa resedaeformis*) from the Gulf of Alaska." (poster)  
 1<sup>st</sup> International Tarpon Symposium – University of Texas Marine Science Institute, Port Aransas, Texas.  
 "Radiometric age validation of Atlantic tarpon (*Megalops atlanticus*)." (oral)  
 3<sup>rd</sup> Annual San Francisco Bay Area Conservation Biology Symposium – Davis, California.  
 "Age and growth and radiometric validation of a deep-sea, habitat forming gorgonian (*Primnoa resedaeformis*) from the Gulf of Alaska." (poster)
- 2000**  
 1<sup>st</sup> International Symposium on Deep Sea Corals – Halifax, Nova Scotia.  
 "Age and growth of a deep-sea, habitat-forming octocorallian (*Primnoa* sp.)." (oral)  
 American Society of Ichthyologists and Herpetologists – La Paz, Baja Sur, Mexico.  
 1) "Radiometric age validation of the bocaccio rockfish, *Sebastes paucispinis*." (poster)

2) "Age and growth of a deep-sea, habitat-forming octocorallian (*Primnoa* sp.)." (poster)

11<sup>th</sup> Western Groundfish Conference – Sitka, Alaska.

"Radiometric age validation of the bocaccio rockfish, *Sebastes paucispinis*." (poster)

## 1998

10<sup>th</sup> Western Groundfish Conference – Asilomar, California.

"Age and growth of the Pacific grenadier (Family Macrouridae, *Coryphaenoides acrolepis*) with age estimate validation using an improved radiometric ageing technique." (oral)

2<sup>nd</sup> International Symposium on Fish Otolith Research and Application – Bergen, Norway.

1) "Age and growth of the Pacific grenadier (Family Macrouridae, *Coryphaenoides acrolepis*) with age estimate validation using an improved radiometric ageing technique." (oral)

2) "Application of the radiometric ageing technique using <sup>210</sup>Pb:<sup>226</sup>Ra disequilibria in calcified structures of two long-lived fishes: Atlantic tarpon (*Megalops atlanticus*) and Atlantic sturgeon (*Acipenser oxyrinchus*)." (poster)

## 1997

8<sup>th</sup> Deep Sea Biology Symposium - Monterey, California.

"Radiometric age determination of the Pacific grenadier (*Coryphaenoides acrolepis*), a rapidly developing fishery in Monterey Bay." (oral)

### **Best Student Paper Award**

American Society of Ichthyologists and Herpetologists - Seattle, Washington.

"Radiometric age determination of the Pacific grenadier (*Coryphaenoides acrolepis*), a rapidly developing fishery of the Pacific Ocean." (oral)

## 1996

Monterey Bay Marine Biogeochemistry Meeting - University of California, Santa Cruz. "Dating fish in the 90's." (oral)

## Field work highlights

2006 Davidson Seamount, California ~ Deep sea explorations and sample collections (RV Western Flyer)  
(<http://oceanexplorer.noaa.gov/explorations/06davidson/welcome.html>) **Published**

1993-1996 Baja California, Mexico ~ Regional fish surveys and extended research on age and growth of spotted sand bass (*Paralabrax maculatofasciatus*)  
**Published**

1991-1993 Deep sea central California ~ Deep sea trawling for fauna assays off Farallon Islands and Monterey Bay Canyon  
2000-3000 m bottom trawling (RV Point Sur & RV Wecoma) **Published**

1990 Fjords of Southeast Alaska ~ benthic fjord community research and sea otter feeding assays (RV Alpha Helix)

## News and media articles

**Public Service Announcement** – Contributed an ulua age and growth plot for fish tag return video by Pacific Islands Fisheries Group (FishToday.org) -  
[https://youtu.be/g\\_ApoSTLizY](https://youtu.be/g_ApoSTLizY) July 2020

**Bigmouth buffalo fish age validation** – Local and national media coverage of the work published in Communications Biology (Nature.com)

Eyewitness News 5 (ABC) – "Minnesota man catches a mystery fish; Rare for its color, remarkable for its age." (<https://kstp.com/news/minnesota-rare-bigmouth-buffalo-fish-brainerd/5381573/>) 11 June 2019

MPR News – "New appreciation for a Minnesota fish long considered junk" *Article and Audio Story*

(<https://www.mprnews.org/story/2019/06/10/new-appreciation-for-a-minnesota-fish-long-considered-junk?>) 10 June 2019

INFORUM – "NDSU researcher finds some Minnesota fish live more than 100 years" (<https://www.inforum.com/sports/outdoors/>) 29 May 2019

Prairie Public News – PODCAST "Now that's an old fish!" (<https://news.prairiepublic.org/post/now-thats-old-fish?>) 29 May 2019

Communications Biology Metrics: <https://www.nature.com/articles/s42003-019-0452-0/metrics>

**Blue marlin age validation** – Local and national media coverage of the work published in Canadian Journal of Fisheries and Aquatic Sciences

Bluewater Magazine – Article by Julian Pepperell, Feb 2018 issue #129 (<https://bluewatermag.com.au>)

Fishing and Travel Magazine – Billfish Foundation article, Jan-Mar 2018 issue (<http://www.fishing-and-travel.com/>)

NEWSWEEK – <http://www.newsweek.com/how-nuclear-bombs-helped-scientists-find-age-gigantic-marlin-fish-754501>

PIFSC News and Highlights – [https://www.pifsc.noaa.gov/news/the\\_grander\\_blue\\_marlin\\_a\\_young\\_giant.php](https://www.pifsc.noaa.gov/news/the_grander_blue_marlin_a_young_giant.php)

The Billfish Foundation – <http://www.billfish.org/news/results-grander-marlin-sample-available-years-landing/>

Civil Beat Honolulu – <http://www.civilbeat.org/2017/11/the-odd-story-of-how-a-uh-scientist-calculated-a-giant-marlins-age/>

**NOAA Okeanos Explorer Program** – Remote participation in "Discovering the Deep: Exploring Remote Pacific Marine Protected Areas"

<http://oceanexplorer.noaa.gov/okeanos/explorations/ex1703/welcome.html>

**Interviews** – Critical insight on recent findings for *Science* article on “400-year-old Greenland shark” – New York Times, LA Times, and CNN

**COSEE Island Earth – 760 AM Radio Interview (Podcast 16 August 2016)**

Special 50<sup>th</sup> Episode interview: <http://www.cosee-ie.net/programs/allthingsmarineradioshow/>

**NOAA Coral Reef Conservation Program** – “A Closer Look at Guam's Coral Reefs Reveals a Nuclear Timeline”

<http://coralreef.noaa.gov/aboutcrp/news/featuredstories/2016aug/welcome.html>

**ETH Zurich** – Annual Report 2015: Laboratory of Ion Beam Physics

1) “Can Red Snapper Live for Half a Century? – Laser-Ablation AMS Reveals Complete Bomb <sup>14</sup>C Signal in an Otolith”

2) “Indirect Radiocarbon Dating of a Pearl Oyster – Rapid Analysis of a Marine Carbonate Sample by Laser Ablation AMS”

<https://www.ethz.ch/content/specialinterest/phys/particle-physics/ion-beam-physics/en.html>

**Phys.org** – “Biological ‘clock’ discovered in sea turtle shells” <http://m.phys.org/news/2016-01-biological-clock-sea-turtle-shells.html>

**Marianas Variety (Micronesian Newspaper)** – Newspaper article “Age Matters Even for Fish”

<http://www.mvariety.com/cnmi/cnmi-news/local/81577-age-matters-even-for-fish>

**Saipan TV News (KSPN2)** - Oral broadcast interview with regional reporter Tori Youngblood. <http://www.saipantv.com/video.asp?vidID=1232&secID=36>

**Hanauma Bay Education Program: Sundays at the Bay - Science and the Open Ocean - Outreach Talk #2**

“Bombs and fish – How nuclear explosions can tell us about the age of fishes” broadcast on YouTube: <https://youtu.be/lZ9VzB0lw3Y>

**Fishermen's News, Volume 70 (No. 03)**

Atom Bomb Tests Help Determine Age of Fish (March 1, 2014)

<http://www.fishermensnews.com/story/2014/03/01/features/atom-bomb-tests-help-determine-age-of-fish/241.html>

**COSEE Island Earth – 760 AM Radio Interview (Podcast 3 December 2013)**

How long fish live and how bomb radiocarbon dating works: <http://www.cosee-ie.net/programs/allthingsmarineradioshow/>

(I created a slideshow version and posted it to YouTube ([http://www.youtube.com/watch?v=\\_IHxz2K8pmQ](http://www.youtube.com/watch?v=_IHxz2K8pmQ)))

**Leica Microsystems – Science Lab**

Speckled hind and new microscopy technique to age fish: <http://www.leica-microsystems.com/science-lab/>

**National and California Sea Grant**

White abalone recovery: <http://caseagrantnews.org/2013/07/30/new-study-adds-urgency-to-abalone-recovery/>

<http://seagrant.noaa.gov/News/SeaGrantAnnouncements/TabId/275/ArtMID/731/ArticleID/56/New-Study-Adds-Urgency-to-Abalone-Recovery.aspx>

<http://oceanspaces.org/blog/new-study-adds-urgency-abalone-recovery>

**American Institute of Fishery Research Biologists**

Member Spotlight: <http://www.aifrb.org/2013/04/dr-allen-hia-andrews/>

**Bottomfish News**

Nuclear bombs and how long opakapaka can live: <http://hawaiiibottomfish.info/docs/2013/BFNEWSVOL15.pdf>

**Report to the Western Pacific Fisheries Management Council**

Development of bomb radiocarbon reference chronologies – September 2013

Bomb radiocarbon dating improves hapu'upu'u age estimation – October 2012

Radioisotope methods improve reliability of opakapaka age determination – September 2010

**Quarterly Research Bulletin**

Development of bomb radiocarbon reference chronologies: [http://www.pifsc.noaa.gov/qrb/2013\\_10/article\\_16.php](http://www.pifsc.noaa.gov/qrb/2013_10/article_16.php)

Hapu'upu'u – Hawaiian grouper (*Hyporthodus quernus*): [http://www.pifsc.noaa.gov/qrb/2012\\_10/article\\_14.php](http://www.pifsc.noaa.gov/qrb/2012_10/article_14.php)

Kala – bluespine unicornfish (*Naso unicornis*): [http://www.pifsc.noaa.gov/qrb/2012\\_06/article\\_03.php](http://www.pifsc.noaa.gov/qrb/2012_06/article_03.php)

Opakapaka – Hawaiian pink snapper (*Pristipomoides filamentosus*): [http://www.pifsc.noaa.gov/qrb/2010\\_10/article\\_05.php](http://www.pifsc.noaa.gov/qrb/2010_10/article_05.php)

**Year in Review (PIFSC - NOAA)**

Biological Studies Support Improved Bottomfish Stock Assessment

[http://www.pifsc.noaa.gov/do/annualreport2010/sustainable\\_fisheries\\_and\\_fishing\\_communities.php](http://www.pifsc.noaa.gov/do/annualreport2010/sustainable_fisheries_and_fishing_communities.php)

**Shark Year Magazine**

<http://sharkyear.com/?s=allan+andrews>

**NOSAMS Related Research**

<http://nosamsresearch.whoi.edu>

### **Davidson Seamount explorations.**

NOAA Ocean Explorer:

[http://oceanexplorer.noaa.gov/explorations/06davidson/background/explorers/explorers.html#explorer\\_1](http://oceanexplorer.noaa.gov/explorations/06davidson/background/explorers/explorers.html#explorer_1)

<http://oceanexplorer.noaa.gov/explorations/06davidson/background/conservation/conservation.html>

<http://oceanexplorer.noaa.gov/explorations/06davidson/background/ageing/ageing.html>

Local Network Broadcasts:

KSBW-8 (NBC, Monterey County) February 8, 2006: 5, 6 and 11pm, video footage and interview.

KION-46 (CBS, Monterey County) February 8, 2006: 6 and 11pm, video footage and interview.

Science News for Kids: <http://www.sciencenewsforkids.org/2006/02/coral-gardens-3/>

Popular articles – February 2006

Monterey Herald, Santa Cruz Sentinel Newspaper, Vancouver Aquarium Aquanews

### **Red tree coral age, growth, and longevity validation.**

National Public Radio: <http://seagrant.uaf.edu/news/01ASJ/11.02.01deepsea-coral.html>

Sitnews - Ketchikan, Alaska: [http://www.sitnews.us/0305news/031105/031105\\_asj\\_coral.html](http://www.sitnews.us/0305news/031105/031105_asj_coral.html)

NOAA Ocean Explorer: <http://oceanexplorer.noaa.gov/explorations/02davidson/background/corals/corals.html>

### **Pacific grenadier age, growth, and longevity validation.**

Personal interview: [http://sciencenotes.ucsc.edu/9701/full/features/grenadier/Grenadier\\_home.html](http://sciencenotes.ucsc.edu/9701/full/features/grenadier/Grenadier_home.html)

Wildlife Conservation Magazine 1998: Popular article: "Tale of Two Fishes"

## Professional organizations

Hanauma Bay Education Program, 2010 - Fishbase Collaborator, 2010 - Hawaii Astronomical Society, 2009 - American Geophysical Union, 2008 - Committee of Age Reading Experts, 1998 - American Institute of Fishery Research Biologists, 1998 - American Society of Ichthyologists and Herpetologists, 1994 - American Fisheries Society, 1994 - Western Society of Naturalists, 1994 - Fremont Peak Observatory Association, 1994 - American Elasmobranch Society, 1993

## Personal and Professional References

Robert Humphreys - PIFSC, Life History Program ([robert.leslie.humphreys.jr@gmail.com](mailto:robert.leslie.humphreys.jr@gmail.com))

Gregor Cailliet - Moss Landing Marine Laboratories ([Cailliet@mml.calstate.edu](mailto:Cailliet@mml.calstate.edu))

Jeff Drazen - University of Hawaii ([jdrazen@hawaii.edu](mailto:jdrazen@hawaii.edu))

Di Tracey - National Institute of Water and Atmospheric Research, New Zealand ([Di.Tracey@niwa.co.nz](mailto:Di.Tracey@niwa.co.nz))

John Kalish - Department of Foreign Affairs and Trade, Australia ([John.Kalish@dfat.gov.au](mailto:John.Kalish@dfat.gov.au))

**Google Scholar** - Comprehensive list of publications - <https://scholar.google.com/citations?hl=en&user=xALzdJUAAAAJ>

**Research Gate** - [https://www.researchgate.net/profile/Allen\\_Andrews2](https://www.researchgate.net/profile/Allen_Andrews2)

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## Professional and Personal Website

**www.astrofich.me** - A synopsis of my work with fishes, various marine organisms, and bio-geo-radiochemistry is available at this website. Reprints of scientific publications and reports are available on this website and upon request.