

# Toby S. Daly-Engel

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## CURRENT APPOINTMENT

- 2009 – 2012      **NIH Postdoctoral Research Fellow** – Arizona Research Labs, University of Arizona, Tucson AZ
- Major projects: Sexual selection and the genetic mating system of the giant water bug, *Abedus herberti*; Reproduction, phylogeography, and taxonomy of deep water sharks
  - Advisorship: Robert L. Smith and Diana E. Wheeler

## EDUCATION

- 2009              **Ph.D. Zoology. University of Hawaii, Honolulu HI**
- Specializing in Ecology, Evolution, and Conservation Biology
  - Advisorship: Brian W. Bowen and Kim N. Holland. Dissertation title: Genetic diversity reveals cryptic reproductive behavior in sharks
- 2005              **M.S. Zoology. University of Hawaii, Honolulu HI**
- 2000              **B.A. Biology. Oberlin College, Oberlin OH**

## RESEARCH EXPERIENCE

- 2006 – 2009      **Research Assistant** – Hunter Lab, Hawaii Institute of Marine Biology, HI
- Project title: Aquaculturing native Hawaiian sea urchins, *Tripneustes gratilla*
  - Designed and implemented aquaculture protocols for urchin stock enhancement
- 2007 – 2008      **Research Diver** – NOAA Ship *Hi'ialakai*
- Hawaii Institute of Marine Biology expeditions to the Northwest Hawaiian Islands
  - Sampled reef fishes using pole spear and hand-lined sharks for telemetry studies (55+ days at sea)
- 2003 – 2008      **Field Technician** – Holland Lab, Hawaii Institute of Marine Biology, HI
- Project title: Hawaii Elasmobranch Longline Survey
  - Set longlines at 80-500m depth for tag-and-release survey of sharks in Hawaii (100+ days at sea)
- 2000 – 2002      **Research Assistant** – Harn Lab, Harvard School of Public Health, MA
- Project title: Molecular mechanisms of immunomodulatory oligosaccharides
  - Conducted laboratory-based immunoassays and experiments in a murine model
- 1999              **Research Intern** – Rittschof Lab, Duke University Marine Laboratory, NC
- Project title: Retention of summer and winter flounder and diel movement patterns of giant whelks in the Rachel Carson Estuarine Research Reserve
  - Conducted field and laboratory experiments to examine faunal use of marine reserve
- 1999              **Independent Research** – Rittschof Lab, Duke University Marine Laboratory, NC
- Project title: Analysis of proteolytic enzymes in the egg masses of female fiddler crabs

## PUBLICATIONS

- In Review Fitzpatrick, J.L., R.M. Kempster, **T.S. Daly-Engel**, S.P. Collin, and J.P. Evans. Assessing the potential for postcopulatory sexual selection in elasmobranchs. The Journal of Fish Biology's 2012 special issue, The Current Status of Elasmobranchs: Biology, Fisheries and Conservation xx: xxx-xxx
- Daly-Engel, T.S.**, K.M. Duncan, K.N. Holland, J.P. Coffey\*, H.A. Nance, R.J. Toonen, and B.W. Bowen. Global phylogeography with mixed-marker analysis reveals male-mediated dispersal in the endangered scalloped hammerhead shark (*Sphyrna lewini*). PLoS One xx: xxx-xxx
- Daly-Engel, T.S.**, J.E. Randall, and B.W. Bowen. Is the Great Barracuda (*Sphyraena barracuda*) a reef fish or a pelagic fish? The phylogeographic perspective. Marine Biology xx: xxx-xxx
- Espasandin\*, C., **T. Daly-Engel**, A. Stankus, J. Nakaya, and C. Hunter. A novel external tagging protocol for individual identification of the edible sea urchin, *Tripneustes gratilla* (Echinodermata). Aquaculture xx: xxx-xxx
- 2011 Cotton, C.F., R.D. Grubbs, **T.S. Daly-Engel**, P.D. Lynch, and J.A. Musick. Age, growth and reproduction of *Squalus* cf. *mitsukurii* from Hawaiian waters. Marine and Freshwater Research 62: 811-822
- Toonen, R.J., K.R. Andrews, I.B. Baums, C.E. Bird, G.T. Concepcion, **T.S. Daly-Engel**, J.A. Eble, A. Faucci, M.R. Gaither, M. Iacchei, J.B. Puritz, J.K. Schultz, D.J. Skillings, M.A. Timmers, and B.W. Bowen. Defining boundaries for ecosystem-based management: a multispecies case study of marine connectivity across the Hawaiian Archipelago. Journal of Marine Biology 2011: 1-13
- 2010 **Daly-Engel, T.S.**, R.D. Grubbs, K. Feldheim, B.W. Bowen, and R.J. Toonen. Is multiple mating beneficial or unavoidable? Low multiple paternity and genetic diversity in the shortspine spurdog, *Squalus mitsukurii*. Marine Ecology Progress Series 403: 255-267
- Ebert, D.A., W.T. White, K.J. Goldman, L.J.V. Compagno, **T.S. Daly-Engel**, and R.D. Ward. Reevaluation and redescription of *Squalus suckleyi* (Girard, 1854) from the North Pacific, with comments on the *Squalus acanthias* subgroup (Squaliformes: Squalidae: *Squalus*). Zootaxa 2612: 22-40
- 2009 Nance, H.A., **T.S. Daly-Engel**, and P.B. Marko. New microsatellite loci for the endangered scalloped hammerhead shark, *Sphyrna lewini*. Molecular Ecology Resources 9: 955-957
- 2008 Bienfang, P., B. Oben, S. DeFelice, P. Moeller, K. Huncik, P. Oben, R. Toonen, **T. Daly-Engel**, and B. Bowen. Ciguatera: Detection of neurotoxins in carnivorous reef fish from the coast of Cameroon, West Africa. African Journal of Marine Science 30: 533-540
- 2007 **Daly-Engel, T.S.**, R.D. Grubbs, B.W. Bowen, and R.J. Toonen (2007) Frequency of multiple paternity in an unexploited tropical population of sandbar sharks, *Carcharhinus plumbeus*. Canadian Journal of Fisheries and Aquatic Sciences 64: 198-204
- 2006 **Daly-Engel, T.S.**, R.D. Grubbs, K.N. Holland, R.J. Toonen, and B.W. Bowen (2006) Assessment of multiple paternity in single litters from three species of carcharhinid sharks in Hawaii. Environmental Biology of Fishes 76: 419-424

Duncan, K.M. and **T.S. Daly-Engel** (2006) Using forensic science problems as teaching tools. The Science Teacher Nov. 06: 38-43

2001 Atochina O., **T. Daly-Engel**, D. Piskorska, E. McGuire, D. Harn (2001) A schistosome expressed immunomodulatory glycoconjugate expands peritoneal Gr1<sup>+</sup> macrophages that suppress naïve CD4<sup>+</sup> T cell proliferation via an interferon gamma and nitric oxide dependent mechanism. Journal of Immunology 167: 4293-4302

\* Undergraduate assistant

## GRANTS AND FELLOWSHIPS

2011	\$1,000	Center for Insect Science Travel Award
2009	\$5,000	Achievement Rewards for College Scientists (ARCS) Award, declined
2009	\$400	American Elasmobranch Society Student Travel Award
2009	\$1,900	HIMB-PMNM Partnership Travel Award
2009	\$1,500	University of Hawaii Graduate Division Dai Ho Chun Travel Award
2008	\$250,000	Postdoctoral Excellence in Research and Teaching (PERT) Fellowship
2008	\$5,300	PADI Foundation Grant
2008	\$20,000	American Association of University Women Dissertation Fellowship
2008	\$1,500	Arts and Sciences Advisory Council Award
2008	\$981	University of Hawaii Graduate Student Organization Travel Award
2007	\$1,000	Sigma Xi Grant-in-Aid of Research
2007	\$700	Evolution, Ecology and Conservation Biology Student Research Award
2007	\$500	UH Foundation Shark Education and Research Travel Grant
2007	\$506	University of Hawaii Graduate Student Organization Travel Award
2006	\$1,320	National Science Foundation GK-12 Project Continuation Grant
2006	\$1,800	University of Hawaii Graduate Division Dai Ho Chun Travel Award
2005	\$220	Sigma Xi Grant-in-Aid of Research
2005	\$900	Evolution, Ecology and Conservation Biology Student Travel Award
2004	\$64,000	National Science Foundation GK-12 Fellowship
2004	\$800	Evolution, Ecology and Conservation Biology Student Research Award
1999	\$1,200	Laura J. Grierson Memorial Scholarship for Independent Study

## TEACHING EXPERIENCE

2010	<b>Adjunct Professor</b> – Pima Community College Desert Vista Campus, Tucson AZ <ul style="list-style-type: none"> <li>• Introductory Biology for Allied Health Professions (BIO 156)</li> </ul>
2008 – 2009	<b>Education Consultant</b> – Education Department, University of Hawaii, Honolulu HI <ul style="list-style-type: none"> <li>• Conducted seminars as part of yearly Teaching Assistant training workshops</li> <li>• Consulted on developing teacher training programs in the natural sciences</li> </ul>

- 2004 – 2006      **NSF Graduate Teaching Fellow** – University of Hawaii, Honolulu HI
- Two-year fellowship through the National Science Foundation GK-12 Program
  - Used sharks as a model to teach evolution and ecology to high school students
- 2005              **Teaching Assistant** – Hawaii Institute of Marine Biology, Kaneohe HI
- Pauley Summer Research Program: Designing risk assessment programs in the Pacific Rim
- 2003 – 2004      **Teaching Evaluator** – University of Hawaii Education Department, Honolulu HI
- Provided assessments for TAs and faculty through the Center for Teaching Excellence
- 2002 – 2004      **Teaching Assistant** – University of Hawaii, Honolulu HI
- Introductory Biology Laboratory for Majors (BIOL 171), two semesters
  - Developmental Zoology (ZOOL 420), two semesters
  - Animal Evolution (ZOOL 480), one semester
- 2000              **Instructor** – Ch’ooshgai Community School, Tohatchi NM
- Navajo Cooperative Teaching Project

### **ADVISING, MENTORING, AND TEACHING DEVELOPMENT**

- 2010 – 2011      Research adviser in shark and insect reproduction and phylogenetics for Pima Community College undergraduates Brad Freese, Saul Macias, and Samantha Boleyn
- 2010 – 2011      Small Group Mentor in the Undergraduate Biology Research Program (UBRP) for University of Arizona undergraduates I. Salt, P. Kojs, J. Jemmett, C. Henrichsen, L. Gregston, A. Conn, M. Wanat, J. Kornrumpf, P. Kishi, J. Hung, J. Harper, J. Friel, J. Englert, J. Fijal, C. Harrison, W. Ke, R. Langston, S. Ogle, A. Saarela, K. Smith, W. Stover, E. Beneze, and G. Young
- 2010              Pedagogy Workshop on Effective Teaching in the Sciences (Dr. Josephine Kurdziel, University of Michigan), Tucson AZ
- 2006 – 2009      Research mentor in sea urchin aquaculture for University of Hawaii undergraduates Carrie Espasandin, Jan Nakaya, Joseph Weston, Katie Bishop, Annie Dowling, Michelle Wong, and Guillermo Paramount at the Hawaii Institute of Marine Biology
- 2005 – 2009      Directed research mentor in fish genetics for Hawaii Pacific University undergraduates John Coffey, Tiana-Rae Bordenave, and Amy Milazzo at the Hawaii Institute of Marine Biology

### **PROFESSIONAL SERVICE**

- 2011              PERT Admissions Committee, post-doc representative
- 2010 – 2011      Head PERT post-doc, responsible for organizing PERT program meetings and guest speakers
- 2006 – 2011      Reviewer for the Journal of Heredity, Journal of Fish Biology, Marine Ecology Progress Series, Marine and Freshwater Research, Journal of Crustacean Biology, Journal of Marine Biology, Environmental Biology of Fishes, Biological Journal of the Linnean Society, and Conservation Genetics
- 2010              Organizer and judge for the Albert L. Tester Memorial Symposium, University of Hawaii, Honolulu HI
- 2008 – 2010      Student Affairs Committee for the American Elasmobranch Society
- Organized the 2009 and 2010 Graduate Student Workshops entitled “How to be a Successful Scientist and Still Have a Life” and “Tips on Becoming a Good Reviewer”

- 2007 – 2009 Chapter secretary for the Graduate Women in Science Alpha Lambda Society  
 2004 Admissions Committee for the University of Hawaii Zoology Department  
 2003 – 2004 Graduate Representative for the University of Hawaii Zoology Department

## AWARDS

- 2009 Best Paper, Albert L. Tester Memorial Symposium, University of Hawaii, Honolulu HI  
 2004 Outstanding Teaching Assistant Award, University of Hawaii Biology Department

## INVITED TALKS

- 2009 Genetic diversity reveals a cryptic, temporally unstable evolutionary lineage in *Sphyrna barracuda*. 8<sup>th</sup> Indo-Pacific Fish Conference (Phylogeography), Fremantle, Australia  
 2006 Demystifying Shark Attack: Using Sharks as a Model to Teach Ecology and Evolution, Maui Ocean Center, Wailuku HI

## SELECTED ORAL PRESENTATIONS

- 2011 Global molecular phylogeography reveals male-mediated dispersal in the endangered scalloped hammerhead shark (*Sphyrna lewini*), 2<sup>nd</sup> International Marine Conservation Congress, Victoria BC  
 2010 Male-mediated dispersal in an incipient global ring species, the scalloped hammerhead shark (*Sphyrna lewini*), Joint Meeting of Ichthyologists and Herpetologists, Providence RI  
 2010 Using forensic science problems as teaching tools. Special Symposium on Effective Course Design, 2010 IRACDA Conference, Boston MA  
 2009 Sexual conflict drives low multiple paternity and genetic diversity in the shortspine spurdog shark (*Squalus mitsukurii*). Joint Meeting of Ichthyologists and Herpetologists, Portland OR  
 2009 Sexual conflict drives low multiple paternity and genetic diversity in the shortspine spurdog shark (*Squalus mitsukurii*). 8<sup>th</sup> Indo-Pacific Fish Conference, Fremantle, Australia  
 2009 Genetic diversity reveals a cryptic, temporally unstable evolutionary lineage in *Sphyrna barracuda*. Albert L. Tester Memorial Symposium, University of Hawaii, Honolulu HI  
 2008 Global genetic survey reveals a cryptic, temporally unstable evolutionary lineage in *Sphyrna barracuda*. Joint Meeting of Ichthyologists and Herpetologists, Montreal CA  
 2008 Comparative study of multiple paternity rates in sharks. Albert L. Tester Memorial Symposium, University of Hawaii at Manoa, Honolulu HI  
 2007 Comparative study of multiple paternity rates in sharks. Evolution 2007, Christchurch, New Zealand  
 2006 Frequency of multiple paternity in an unfished tropical population of sandbar sharks. Joint meeting of Ichthyologists and Herpetologists, New Orleans LA  
 2006 Frequency of multiple paternity in an unfished tropical population of sandbar sharks, *Carcharhinus plumbeus*. Albert L. Tester Memorial Symposium, University of Hawaii, Honolulu HI  
 2005 Assessment of multiple paternity for three species of congeneric sharks (*Carcharhinus*) in Hawaii. Joint meeting of Ichthyologists and Herpetologists, Tampa FL  
 2005 Multiple paternity assessments for three congeneric shark species (*Carcharhinus*) in Hawaii. Albert

L. Tester Memorial Symposium, University of Hawaii, Honolulu HI

2004 Population ecology of the sandbar shark (*Carcharhinus plumbeus*) in Hawaii. Albert L. Tester Memorial Symposium, University of Hawaii, Honolulu HI

### **OUTREACH AND GUEST LECTURES**

2011 Women in Science and Engineering (WiSE) “Expanding Your Horizons” 2011 Workshop

2010 Guest speaker at the USDA Arid-Land Agricultural Resource Center’s Fall Seminar Series, Maricopa AZ

2009 Guest speaker for the Hawaiian Islands Humpback Whale National Marine Sanctuary lecture series, Honolulu HI

2008 Guest lecturer for the Bishop Museum Shark Seminar Series, Honolulu HI

2008 Judge for the Hawaii State Science Fair, Honolulu HI

2007 – 2009 Guest lecturer for Marine Biology (ZOO 200) at the University of Hawaii, three semesters

2007 – 2008 Guest lecturer for Vertebrate Zoology (ZOO 320) and Marine Science (ZOO 420) at the University of Hawaii, two semesters each

2007 Science Fair Judge for the Hawaii Association of Independent Schools (HAIS), Honolulu HI

2006 – 2008 Guest speaker for the University of Hawaii’s undergraduate Marine Options Program (MOP)

2006 Science Judge for the Hawaii Regional Ocean Science Bowl, Honolulu HI

2006 Guest speaker for the Hanauma Bay Nature Preserve Education Program, Honolulu HI

2005 Video host for 21st Century Learning’s educational film “Science of Sharks”

2005 Presenter for the Hawaii Science Teachers Association (HaSTA) Meeting, Honolulu HI

### **PROFESSIONAL AFFILIATIONS**

2009 Oceania Chondrichthyan Society

2007 Society for the Study of Evolution

2007 American Society of Naturalists

2007 American Association of Underwater Scientists

2006 American Fisheries Society

2005 Graduate Women in Science

2005 Sigma Xi

2002 American Society of Ichthyologists and Herpetologists

2002 American Elasmobranch Society

### **SKILLS AND CERTIFICATIONS**

- AAUS-Certified Scientific Diver
- Department of the Interior Licensed Boat Operator

## REFERENCES

- Robert L. Smith, Ph.D., University of Arizona, Tucson, AZ (520) 621-1151, bobsmith@ag.arizona.edu
- Diana E. Wheeler, Ph.D., University of Arizona, Tucson, AZ (520) 621-1151, dewnants@ag.arizona.edu
- Julia Fiello, MS, Pima Community College, Tucson, AZ (520) 206-5005, jfiello@pima.edu
- Kim N. Holland, Ph.D., Hawaii Institute of Marine Biology, Kaneohe, HI (808) 236-4710, kholland@hawaii.edu
- Brian W. Bowen, Ph.D., Hawaii Institute of Marine Biology, Kaneohe, HI (808) 236-4726, bbowen@hawaii.edu
- Robert J. Toonen, Ph.D., Hawaii Institute of Marine Biology, Kaneohe, HI (808) 236-4725, toonen@hawaii.edu