

## Kit Yu Karen CHAN

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### Research interests

Broadly speaking, I am interested in combining experimental and modeling techniques to understand the role of individual behaviors in shaping population-level ecological interactions. Specifically, I am interested in 1) swimming performance of marine plankton, its relationship with physiologies, particularly in response to environmental variations such as ocean acidification, and its implications on population dynamics; 2) Functional morphology of marine plankton and its evolutionary implications. As an educator, I am interested in developing instructional techniques that would improve students' understanding of and interest in the scientific process.

### Current appointment

2012- present Postdoctoral Scholar, Coastal Ocean Institute, Woods Hole Oceanographic Institution  
Sponsors: Jesus Pineda, Biology Department and Houshuo Jiang, Applied Physics and Ocean Engineering

### Education

2009-2012 PhD, School of Oceanography, University of Washington  
Chairperson of reading committee: Daniel Grünbaum  
Doctoral dissertation: Consequences of ocean change for ecological function : observational and modeling case studies of larval echinoderms

2006-2009 MSc, School of Oceanography, University of Washington  
Thesis: Effects of temperature and diet on swimming behaviors of larval sand dollars

2005-2006 Exchange student, Dept. Ecology and Evolution, University of California, Davis

2003-2006 BSc, 1<sup>st</sup> class honors, Environmental Life Science, University of Hong Kong  
Honors thesis: Paleoclimatic record of planktonic foraminifera assemblages and its isotopic variations of Storegga submarine landslide

### Research Experience

Summer 2011 Visiting Scientist, Sven Lovén Center of Marine Sciences and Research, University of Gothenburg, Sweden.  
Hosts: Dr. Sam Dupont and Dr. Micheal Thorndyke  
*Skills:* Metabolic experiments of small organisms (respirometry and clearance rate), sperm motility analysis, ocean acidification impact on echinoids

2006-present Research Assistant for Dr. Daniel Grünbaum, University of Washington  
*Skills:* Video motion analysis, computer programming (Matlab, python, C), animals collections, larval rearing, sea water carbonate chemistry manipulation, confocal microscopy

2005-2006 Research Assistant, Dr. Howard Spero and Dr. Tessa Hill, Dept of Geology, UC, Davis  
*Skills:* Sample preparation for stable isotope analysis and foraminifera identification

Summer 2005 Research Assistant of Dr. Cynthia Yau, Swire Institute of Marine Science  
*Skills:* Icythyoplankton survey & identification; microchemical analysis for statoliths

Spring 2005 Student Intern for World Conservation Society, Irrawaddy Dolphins in Mekong River, Cambodia Conservation Project  
*Skills:* On water population survey for marine mammals and photo identification

Summer 2004 Research Assistant of Dr. Benny Chan, Swire Institute of Marine Science  
*Skills:* Barnacle larval rearing and scanning electronic microscopy

**Teaching Experience**

- Spring 2012 Pre-doctoral Instructor, Field Investigations in Oceanography, Univ. of Washington.  
*Responsibilities:* Lecture on basic principles of biological oceanography, design and instruct students to complete independent research projects
- Spring 2011 Course instructor, Scientific Process in Practice, an activity based seminar, , Univ. of Washington.  
*Responsibilities:* Curriculum development, weekly inquiry-based sessions, course evaluation
- Summer 09&10 Teaching Assistant, Friday Harbor Labs  
Larval Biology (Instructors: Dr. Strathmann, Dr. Emlet, Dr. Grünbaum)  
*Responsibilities:* Lectures on larval behaviors & ocean acidification; guide and assist graduate students' independent projects
- Fall 2007 Teaching Assistant, University of Washington  
Introduction to Biological Oceanography (Instructor: Dr. J. Deming)  
*Responsibilities:* Weekly quiz section, develop problem sets and rubrics, one-on-one student consultation, lectures on zooplanktons and fisheries oceanography.

Mentoring and advising

- 2012 Advising Friday Harbor Labs, Blinks - NSF REU summer internship program undergraduate Cristina Villalobos on the effects of ocean acidification on fertilization kinetics. Cristina presented her work at the SACNAS National Conference (Seattle, WA) and Annual Meeting of the Western Society of the Naturalists (Monterey, CA)

**Services**Professional society

- 2011-2014 Student/ Postdoc representative for Division of Invertebrate Zoology, Society for Integrative and Comparative Biology

Journal Reviewer

Marine Ecology Progress Series, Journal of Experimental Marine Biology and Ecology, Plos-One

Teaching related services

- 2011-2012 Graduate student representative, Curriculum Committee, College of Environment, UW
- Feb 2012 Contributor, Best of COSEE-Hands on Activities~ a curriculum for K12 classroom
- Oct 2011 Guest speaker for the OACIS GK12 Program on creating inclusive classrooms
- Jun 2011 Invited speaker on students teaching opportunities, Improving Your Broader Impacts Workshop, Center of Ocean Science Education Excellence (COSEE)- Ocean Learning Communities
- May 2011 Seminar speaker host of the Biology Education Research Group, invited Dr. J. Libarkin from Michigan State University addressing the topic of Visual Literacy
- Winter 2001 Organizer of Teaching Statement workshop for graduate students and postdocs
- 2010 Participant for the 1<sup>st</sup> international planning workshop to establish COSEE-China, Beijing
- 2009-2011 Convener of Ocean Teach Journal Club, Bi-monthly gathering for graduate students and postdocs to discuss matters on teaching and learning
- 2009-2011 Mentor for a high school student on modeling swimming of blastulae
- 2008-2010 Session facilitator for the Annual TA Conference, University of Washington
- 2006-present Technical Advisory Panel member, Science Judge, and Paid Question Writer for the National Ocean Sciences Bowl (NOSB) and Regional NOSB the Orca Bowl
- 2006-present Interpreter and bird team member (animal husbandry) for the Seattle Aquarium

Other services

- 2008-present HKU Alumni Association Washington Chapter, Convener  
 2003-present Hong Kong Outstanding Students' Association, Advisor

**Affiliations to Professional Society**

AAAS, ASLO, SICB, NSTA, NABT

**Grants:**

- 2012 Royal Swedish Academy of Science SEK350,000

**Selected Fellowships and Awards**

- 2012-2014 Croucher Foundation Fellowship for Post-doctoral Research  
 2012 Woods Hole Institutional Postdoctoral Fellowship  
 2011-2012 University of Washington College of Environment Travel Fund  
 2011-2012 Boeing International Fellowship  
 2010-2011 Huckabay Teaching Fellowship  
 2009-2010 Clarence H. Campbell Endowed Lauren Donaldson Scholarship  
 2006-2009 Sir Edward Youde Memorial Fellowship for Overseas Studies  
 2008-2009 Stephen and Ruth Wainwright Endowed Fellowship  
 2005-2006 C.V. Starr Scholarship  
 2004-2006 BSc. 1971 Class Prize  
 2003-2006 Dean's list Honor  
 2004-2005 Sir Edward Youde Memorial Scholarship for Undergraduate Studies  
 2004-2005 HKUWA Thomas HC Cheung Undergraduate Scholarships  
 2003-2004 "Young Leaders of Tomorrow" Community Leaders Scholarship  
 2003-2004 HKU Foundation Entrance Scholarship

**Publications**Scientific publications

- Chan, K.Y.K.**, Grünbaum, D, Arnberg, M., Thorndyke, M., Dupont, S.T. (In press). Ocean acidification induces budding in larval sea urchins. *Marine Biology*.
- Chan, K.Y.K.**. Biomechanics of larval morphology affect swimming: insights from the sand dollars *Dendraster excentricus*. *Integrative and Comparative Biology*. 52:458-469
- Chan, K.Y.K.**, Grünbaum, D., O'Donnell, M. J. 2011. Effects of ocean acidification-induced morphological changes on larval swimming and feeding. *Journal of Experimental Biology* 214: 3857-3867
- Chan, K.Y.K.**, Grünbaum, D. 2010. Temperature and diet modified swimming behaviors of larval sand dollar. *Marine Ecology Progress Series*. 415: 49-59
- Grünbaum, D, **CHAN, K.**, Tobin, E and Nishizaki, M.T. 2008. Non-linear advection-diffusion equations approximate swarming but not schooling populations. *Mathematical Biosciences* 204:38-48
- Høeg, J.T., Achituv, Y., Chan, B.K.K., **Chan, K.Y.K.**, Jensen, P.G. and Pérez-Losada, M. 2008. Cypris morphology in the barnacles *Ibla* and *Paralepas* (Crustacea: Cirripedia Thoracica) implications for cirripede evolution. *Journal of Morphology* 270:241-255
- Chan, B.K.K., **Chan, K.Y.K.** and Leung, M.C. 2005. Burrow architecture of ghost crab *Ocypode ceratophthalma* on a sandy shore of Hong Kong. *Hydrobiologia* 560:43-49

Science education research publication

- CHAN, K.Y.K.**, Yang, S., Maliska, M.E., Grünbaum, D. 2012. Interdisciplinary, guided inquiry on estuarine transport using a computer model in high school classrooms. *American Biology Teachers* 74:26-33

## Presentations

### Selected Scientific presentations

- Lewis, C., **Chan, K.Y.K.**, Dupont, S. 2012. Physiological responses of invertebrate sperm to contaminated, high CO<sub>2</sub> ocean: mechanisms and consequences? Third International Symposium on the Ocean in a High CO<sub>2</sub> World. Monterey, California.
- Dupont, S. **Chan, K.Y.K.**, Thorndyke, M, Oliveri, P. 2012. The cost of (re-) calcification in a high CO<sub>2</sub> world. Third International Symposium on the Ocean in a High CO<sub>2</sub> World. Monterey, California.
- Chan, K.Y.K.**, Grünbaum, D, O'Donnell, M.J., Thorndyke, M., Dupont, S.T. 2012. Ocean acidification impacts on early life history stages of echinoids. 2<sup>nd</sup> ICES/PICES Conference for Early Career Scientists Oceans of Changes. Majorca, Spain.
- Chan, K.Y.K.**, Grünbaum, D, O'Donnell, M.J., Thorndyke, M., Dupont, S.T. 2012. Effects of ocean acidification on physiological and swimming performance of larval echinoids at Ocean Sciences Meeting, Salt Lake City, Utah.
- Chan, K.Y.K.**, Clay, T.W., Grünbaum, D. 2012. Physical constraints on larval swimming and their implications for dispersal at Society for Integrative and Comparative Biology Annual Meeting, Charleston, South Carolina (Invited Symposium Speaker)
- Bowman, J., **Chan, K.Y.K.**, Durkin, C., Hennon, G., Smith, D., Sullivan, B. 2011. Is diversity related to service provision across an Ecosystem? An estuarine case study at World Conference on Marine Biodiversity, Aberdeen, Scotland.
- Chan, K.Y.K.**, Grünbaum, D., O'Donnell, M.J. 2011. Effects of ocean acidification on swimming performance of in larval sand dollars at Society for Integrative and Comparative Biology Annual Meeting, Salt Lake City, Utah.
- Chan, K.Y.K.**, Grünbaum, D., O'Donnell, M.J. 2010. Effects of ocean acidification on larval swimming behaviors of sand dollar, *Dendraster excentricus* at Ocean Sciences Meeting, Portland, Oregon.
- Chan, K.Y.K.**, Grünbaum, D. 2010. Larvae of sand dollar behaviorally compensate for temperature constraints on swimming at Society for Integrative and Comparative Biology Annual Meeting, Seattle, Washington
- Chan, K.Y.K.**, 2007. Responses of geoduck larvae to halocline and food patches at Annual Meeting of National Shellfisheries Association Pacific Coast Section, Welches, Oregon.

### Selected Science education presentations

- Chan, K.Y.K.**, Rocap, G. 2012. Scientific process in practice, an activity based seminar for beginning oceanography majors at University of Washington Annual Teaching and Learning Symposium, Seattle, Washington.
- Chan, K.Y.K.**, Rocap, G. 2012. Scientific process in practice, an activity based seminar for beginning oceanography majors at Ocean Sciences Meeting, Salt Lake City, Utah.
- Chan, K.Y.K.** 2012. Scientific process in practice, an activity based seminar for beginning science majors at Society for Integrative and Comparative Biology Annual Meeting, Charleston, South Carolina
- Chan, K.Y.K.**, Branch, M.C, Yang, S. 2011. Using Computer Models for Guided Inquiry: A Case Study of Biological and Physical Interactions in Estuaries. NSTA Seattle Area Conference on Science Education. Seattle, Washington.
- Chan, K.Y.K.**, Grünbaum, D. 2011. Interdisciplinary, guided inquiry on estuarine transport using a computer model at University of Washington Annual Teaching and Learning Symposium, Seattle, Washington.
- Chan, K.Y.K.**, Grünbaum, D. 2011. Hydrodynamic model of estuary flow and biology in a high school marine science classroom at Society for Integrative and Comparative Biology Annual Meeting, Salt Lake City, Utah.