

# JOHANNA TAYLOR CANNON

University of California, Santa Barbara  
Department of Ecology, Evolution and Marine Biology  
Santa Barbara, California 93106  
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## CURRENT POSITION

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2016-present *Postdoctoral researcher*, University of California, Santa Barbara  
Department of Ecology, Evolution and Marine Biology, PI: Todd Oakley  
*Projects*: Phylogenomics of chitons (Mollusca), exon-capture phylogenomic methods

## EDUCATION

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2014 Ph.D. in Biological Sciences, **Auburn University**, Auburn, AL  
*Advisor*: Kenneth M. Halanych  
*Dissertation title*: Hemichordate phylogeny: A molecular and genomic approach

2004 B.A. in Biology, *cum laude*, **Bryn Mawr College**, Bryn Mawr, PA

## TEACHING EXPERIENCE

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### **Lecturer**

2017 *Macroevolution*, University of California, Santa Barbara

### **Co-Instructor**

2015, 2014 *Systematic Zoology*, Stockholm University

### **Graduate Teaching Assistant**

2013 *Invertebrate Biodiversity Laboratory*, Auburn University  
2012 *Organismal Biology Laboratory*, Auburn University  
2011 *Evolution & Development of the Metazoans*, University of Washington,  
Friday Harbor Laboratories  
2011, 2010 *Genetics Laboratory*, Auburn University  
2010, 2009 *Invertebrate Biodiversity Laboratory*, Auburn University, (volunteer)  
2007 *Principles of Biology Laboratory*, Auburn University

### **Guest Lecturer**

2017 *Invertebrate Zoology*, University of California, Santa Barbara, Topic: "Cnidaria"  
2016 *Invertebrate Zoology*, University of California, Santa Barbara, Topics: "Invertebrate Chordates", "Hemichordata, Chaetognatha, and *Xenoturbella*"  
2013 *Marine Biology*, Auburn University, Topic: "Polar Systems"  
2013 *Invertebrate Biodiversity*, Auburn University, Topic: "Deuterostomia"  
2013 *Organismal Biology*, Auburn University, Topics: "Introduction to Invertebrates", "Lophotrochozoa"  
2012 *Organismal Biology*, Auburn University, Topic: "Chordate Origins"

### **Mentoring Undergraduate Research**

2018-2017 Nick Roberts, UCSB, Undergraduate research project  
Project: Estimating ages of lens eyes in metazoans with time tree methods  
Current position: UCSB Senior, expected graduation June 2018

- 2016 Felix Thalén, Stockholm University, Bachelor's thesis project  
Thesis Title: Phylogenomics of Xenacoelomorpha: Inferring phylogeny accounting for saturation  
Current position: Enrolled in M.S. program in Biology, completed M.S. in Bioinformatics, 2018
- 2011 Kristina Looney, Auburn University, Undergraduate research project  
Project: Molecular characterization of undescribed hemichordate species including regional field collection, DNA extraction, PCR, phylogenetic analysis  
Current position: Cardiac rehab nurse, completed nursing degree 2013
- 2010-2009 Emily Summers, Auburn University, Undergraduate research project  
Project: Study of hemichordate diversity including compilation of primary literature database of original species descriptions, training in molecular techniques  
Current position: High school science teacher, completed M.S. in forestry 2014
- 2009 Caitlin Kelly-Garrick (University of California, Berkeley), Bermuda Institute of Ocean Sciences, Fall Semester Research Project  
Project: Localized distribution of the pterobranch hemichordate *R. normani*  
Current position: Attorney, completed law school 2016

## **RESEARCH AND PROFESSIONAL EXPERIENCE**

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- 2016-present *Postdoctoral researcher*, University of California, Santa Barbara, PI: Todd Oakley  
Phylogenomics of chitons (Mollusca) using exon-capture and transcriptomic methods
- 2016-2014 *Postdoctoral researcher*, Naturhistoriska riksmuseet, PI: Ulf Jondelius  
Genomics of acoelomorph flatworms, deep metazoan phylogenomics
- 2013-2006 *Graduate student researcher*, Auburn University, PI: Kenneth M. Halanych  
Molecular phylogenetics and phylogenomics of Hemichordata
- 2009 *Visiting scientist*, Smithsonian Institution, United States Antarctic Program  
Antarctic pterobranch taxonomy and morphology (July 7 – Aug. 5)
- 2006 *Graduate student research rotation*, Auburn University, PI: Scott Santos  
Developed microsatellite primers for the Hawaiian shrimp *Halocaridina rubra*
- 2006-2004 *Laboratory technician*, University of Virginia, PI: Bettina Winckler  
Membrane protein trafficking in polarized neurons
- 2004-2003 *Undergraduate researcher*, Bryn Mawr College, Advisor: Stephen Gardiner  
Ultrastructural analysis of the photoreceptor structure in a polychaete larva

## **RESEARCH AWARDS AND GRANTS**

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- 2014 SciLifeLab National Projects Grant, Science for Life Laboratory, \$39,300  
Title: “New methods for ancient worms: applying low-input protocols for single-molecule real-time (SMRT) sequencing to Acoelomorpha”  
PIs: **Johanna Cannon** (lead) and Ulf Jondelius
- 2009 Smithsonian Institution Visiting Student Award, National Museum of Natural History, United States Antarctic Program Visitor (July 7 – August 5), \$3,725
- 2009 Grant-in-aid of Research Award, Bermuda Institute of Ocean Sciences, \$2,730

- 2008 Lerner-Gray Fund for Marine Research, American Museum of Natural History, New York, New York, \$1,996
- 2008 Graduate Student Research Award, Auburn University, \$1,000
- 2008 Best Student Poster Award, Division of Systematic & Evolutionary Biology, Society for Integrative and Comparative Biology Annual Meeting, \$150

#### **ACADEMIC FELLOWSHIPS AND SCHOLARSHIPS**

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- 2010 Patricia L. Dudley Fellowship, Friday Harbor Laboratories, \$3,000
- 2010-2008 Graduate Research Scholars Program, Alabama-National Science Foundation Experimental Program to Stimulate Competitive Research (EPSCoR), \$25,000/year
- 2010, 08, 07 Jane P. Shepherd Scholarship for students from Loudoun County, Virginia, \$2,000/yr
- 2007 Libbie H. Hyman Memorial Scholarship, SICB, \$1,000
- 2007-2006 AU Cellular and Molecular Biosciences Doctoral Fellowship, \$18,000

#### **PUBLICATIONS**

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13. Martín-Durán, J.M., K. Pang, A. Børve, H.S. Lê, A. Furu, **J.T. Cannon**, U. Jondelius, A. Hejnol. Convergent Evolution of Bilaterian Nerve Cords. *Nature*. 2018. 553: 45-50.
12. Kocot, K.M., T.H. Struck, J. Merkel, D.S. Waits, C. Todt, P.M. Brannock, D.A. Weese, **J.T. Cannon**, L.L. Moroz, B. Leib, and K.M. Halanych. Phylogenomics of Lophotrochozoa with consideration of systematic error. *Systematic Biology*. 2017. 66: 256-282.
11. Tassia, M.G., **J.T. Cannon**, C.E. Konikoff, N. Shenkar, K.M. Halanych, and B.J. Swalla. The Global Diversity of the Hemichordata. *PLoS One*. 2016. 11(10): e0162564.
10. **Cannon, J.T.**, B. Vellutini, J.S. Smith III, F. Ronquist, U. Jondelius, and A. Hejnol. Xenacoelomorpha is the sister group to Nephrozoa. 2016. *Nature*. 530: 89-93.
9. D'Aniello, S., J. Delroisse, A. Valero-Garcia, E.K. Lowe, M. Byrne, **J.T. Cannon**, K.M. Halanych, M.R. Elphick, J. Mallefet, S. Kaul-Strehlow, C.J. Lowe, P. Flammang, E. Ullrich-Luter, A. Wanninger, and M.I. Arnone. Opsin evolution in the Ambulacraria. 2015. *Marine Genomics*. 24: 177-183.
8. Havird, J.C., K.M. Kocot, P.M. Brannock, **J.T. Cannon**, D.S. Waits, D.A. Weese, S.R. Santos, and K.M. Halanych. Reconstruction of cyclooxygenase evolution in animals suggests variable, lineage-specific prostaglandin synthesis pathways. 2015. *Journal of Molecular Evolution*. 80: 193-208.
7. **Cannon, J.T.**, K.M. Kocot, D.S. Waits, D.A. Weese, B.J. Swalla, S.R. Santos, and K.M. Halanych. Phylogenomic Resolution of the Hemichordate and Echinoderm Clade. 2014. *Current Biology*. 24: 2827-2832.
6. **Cannon, J.T.**, B.J. Swalla, and K.M. Halanych. Hemichordate molecular phylogeny reveals a novel cold-water clade of harrimaniid acorn worms. 2013. *Biological Bulletin*. 225: 194-204.
5. Halanych, K.M., **J.T. Cannon**, A.R. Mahon, B.J. Swalla, and C.R. Smith. Modern Antarctic acorn worms form tubes. 2013. *Nature Communications*. 4: 2738.
4. Kocot, K.M., **J.T. Cannon**, C. Todt, M.R. Citarella, A.B. Kohn, A. Meyer, S.R. Santos, C. Schander, L.L. Moroz, B. Lieb, and K.M. Halanych. Phylogenomics reveals deep molluscan relationships. 2011. *Nature*. 477: 452-456.

3. Kocot, K.M., **J.T. Cannon**, and K.M. Halanych. Elucidating animal phylogeny; advances in knowledge and forthcoming challenges. 2010. In B. Schierwater and R. deSalle, eds., *Key Transitions in Animal Evolution*. CRC Press, Boca Raton, Florida.
2. **Cannon, J.T.**, A.L. Rychel, H. Eccleston, K.M. Halanych, and B.J. Swalla. Molecular phylogeny of Hemichordata, with updated status of deep-sea enteropneusts. 2009. *Molecular Phylogenetics and Evolution*. 52: 17-24.
1. Yap, C., D. Wisco, P. Kujala, Z. Lasiecka, **J.T. Cannon**, M.C. Chang, H. Hirling, J. Klumperman, and B. Winckler. The somatodendritic endosomal regulator NEEP21 facilitates axonal targeting of L1/NgCAM. 2007. *Journal of Cell Biology*. 180: 827-842.

#### **OTHER PUBLICATIONS (Not peer reviewed)**

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2. **Cannon, J.T.** and K.M. Kocot. 2016. Phylogenomic approaches using transcriptome data. Pp. 65-80. In S. Bourlat, Ed., *Marine Genomics – Methods and Protocols*. Humana Press, New York.
1. Halanych, K.M., **J.T. Cannon**, and J. Benito. 2012. Pterobranchia. Pp. 586-587. In McGraw Hill, Editors, *McGraw Hill Encyclopedia of Science & Technology*, 11<sup>th</sup> Edition. Volume 14. McGraw Hill, New York.

#### **INVITED TALKS**

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5. From Ambulacraria to Xenacoelomorpha: what can phylogenomics of obscure worms tell us about early animal evolution? **Cannon, J.T.** California State University, Los Angeles. (November 16, 2017).
4. Big Data, Small Worms: Phylogenomics of Xenacoelomorpha. **Cannon, J.T.** Smithsonian Institution. *Frontiers in Phylogenetics Symposium*. (September 9, 2016).
3. Hemichordate Molecular Phylogeny and Evolution. **Cannon, J.T.** Sars International Centre for Marine Molecular Biology. Bergen, Norway. (September 18, 2012).
2. Hemichordate Phylogenomics. **Cannon, J.T.** Alabama Commission on Higher Education. Montgomery, Alabama. (December 4, 2009).
1. Mysterious creatures of strange aspect: What is a pterobranch? **Cannon, J.T.** Smithsonian Institution, Department of Invertebrate Zoology. (July 16, 2009).

#### **ORAL PRESENTATIONS (\*Undergraduate author)**

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14. Octopus skin “sight” may have evolved through the co-option of a deeply homologous dispersed light sense in mollusc mantle. Ramirez, M.D., **J.T. Cannon**, T.H. Oakley. Society for Integrative and Comparative Biology. San Francisco, California. (January 2018).
13. Prolific origination of eyes in Cnidaria with co-option of non-visual opsins. Picciani, N., J.R. Kerlin\*, N.W. Sierra, D.M. Ramirez, A.J. Swafford, **J.T. Cannon**, U. Jondelius, D.C. Plachetzki, M. Daly, T.H. Oakley. Society for Integrative and Comparative Biology. San Francisco, California (January 2018).
12. Phylogenomics of Lophotrochozoa with Consideration of Systematic Error. Kocot, K.M., T.H. Struck, J. Merkel, D.S. Waits, C. Todt, P.M. Brannock, D.A. Weese, **J.T. Cannon**, L.L. Moroz, B. Lieb, K.M. Halanych. *Society for Integrative and Comparative Biology*. New Orleans, Louisiana. (January 2017).
11. The role of Xenacoelomorpha in understanding the evolution of animal diversity. **Cannon, J.T.**, B. Vellutini, U. Jondelius, A. Hejnol. *Euro Evo Devo*. Uppsala, Sweden. (July 2016).
10. Xenacoelomorpha is the sister group of Nephrozoa. **Cannon, J.T.**, B. Vellutini, J.S. Smith III, F. Ronquist, U. Jondelius, and A. Hejnol. *Evolution in Sweden*. Lund, Sweden. (January 2016).

9. The Xenacoelomorpha are basal bilaterians: Evidence from phylogenomics. **Cannon, J.T.**, B. Vellutini, J.P. Smith III, F. Ronquist, U. Jondelius, and A. Hejnol. *International Symposium on Flatworm Biology*. Oxford, United Kingdom. (August 2015).
8. IceAGE Genetic Results: Hemichordates. **Cannon, J.T.** Senckenberg Biodiversity Institute. *IceAGE Workshop: Genetic Results*. Wilhelmshaven, Germany. (September 2012).
7. Phylogenomics reveals deep molluscan relationships. Kocot, K.M., **J.T. Cannon**, C. Todt, A.B. Kohn, M.R. Citarella, A. Meyer, C. Schander, S.R. Santos, L.L. Moroz, B. Lieb, and K.M. Halanych. *American Malacological Society*. Pittsburgh, PA. (July 2011).
6. Phylogenomics of Hemichordata within Deuterostomia. **Cannon, J.T.**, K.M. Kocot, S.R. Santos, B.J. Swalla and K.M. Halanych. *Southeastern Ecology & Evolution Conference*. Auburn, Alabama. (March 2011).
5. Phylogenomics of Hemichordata within Deuterostomia. **Cannon, J.T.**, K.M. Kocot, S.R. Santos, B.J. Swalla and K.M. Halanych. *Society for Integrative and Comparative Biology*. Salt Lake City, Utah. (January 2011).
4. Phylogenomic investigation of molluscan evolutionary relationships. Kocot, K.M., **J.T. Cannon**, C. Todt, A.B. Kohn, M.R. Citarella, A. Meyer, C. Schander, S.R. Santos, L.L. Moroz, B. Lieb, K.M. Halanych. *Society for Integrative and Comparative Biology*. Salt Lake City, Utah. (January 2011).
3. Comparative transcriptome analyses of Siboglinid annelids with special interest in mechanisms maintaining symbiosis. Halanych, K.M., D.J. Thornhill, C. Schander, K.T. Fielman, K.M. Kocot, **J.T. Cannon**, S.R. Santos. *Society for Integrative and Comparative Biology*. Salt Lake City, Utah. (January 2011).
2. Phylogenomics of Hemichordata within Deuterostomia. **Cannon, J.T.**, K.M. Kocot, S.R. Santos, B.J. Swalla and K.M. Halanych. *Evolution*. Portland, Oregon. (June 2010).
1. Hemichordate evolution: Derived body plans and suspect families. **Cannon, J.T.**, A.L. Rychel, B.J. Swalla and K.M. Halanych. *Society for Integrative and Comparative Biology*. Boston, Massachusetts. (January 2009).

#### **POSTER PRESENTATIONS (\*Undergraduate author)**

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9. Phylogenomic evidence that chiton “shell eyes” may have recently evolved from shell eyespots. **Cannon, J.T.**, A.C.N. Kingston, K.M. Kocot, D.J. Eernisse, T.H. Oakley, D.I. Speiser. *Society for Integrative and Comparative Biology*. San Francisco, California. (January 2018).
  8. Cnidaria and Xenacoelomorpha Opsins Revisited: Extended Sampling Corroborates the Presence of Several Major pre-Bilaterian Groups. N. Picciani, J.R. Kerlin\*, N.W. Sierra, **J.T. Cannon**, M. Daly, D.M. Ramirez, T.H. Oakley. *Society for Integrative and Comparative Biology*. New Orleans, Louisiana. (January 2017).
  7. Hemichordata Global Diversity and Evolution. Tassia, M.G\*., **J.T. Cannon**, C. Konikoff, L. Perry, P. Kaur, K. Dunn, N. Shenkar, K.M. Halanych, and B.J. Swalla. *Society for Integrative and Comparative Biology*. West Palm Beach, Florida. (January 2015).
  6. Phylogenomics of Ambulacraria (Hemichordata + Echinodermata). **Cannon, J.T.**, K.M. Kocot, D.A. Weese, D.S. Waits, B.J. Swalla, S.R. Santos, and K.M. Halanych. *International Congress on Invertebrate Morphology*. Berlin, Germany. (August 2014).
  5. Hemichordate phylogeny and a new deep-sea clade. **Cannon, J.T.**, B.J. Swalla, K.M. Halanych. *Department of Biological Sciences Graduate Research Forum*. Auburn, AL. (April 2013).
  4. Molecular Phylogeny of Hemichordata and Insights into Ancestors. **Cannon, J.T.**, A.L. Rychel, B.J. Swalla and K.M. Halanych. *Southeastern Ecology and Evolution Conference*. Tallahassee, Florida. (March 2008).

3. Hemichordate Relationships and Insights into Ancestors. **Cannon, J.T.**, A.L. Rychel, B.J. Swalla and K.M. Halanych. *Society for Integrative and Comparative Biology*. San Antonio, Texas. (January 2008).
2. Ultrastructural observations of an unusual sensory structure in the cerebral ganglion of *Owenia fusiformis* and *Myriochele* sp. (Polychaeta: Oweniidae). Gardiner, S.L., A.K. Dewan, M.L. Schwartz, **J.T. Cannon**, and B.F. Dickey. *9<sup>th</sup> International Polychaete Conference*. Portland, Maine. (July 2007).
1. Axonal Targeting of NgCAM: Testing the Transcytotic Pathway Model. Yap, C., D. Wisco, **J.T. Cannon**, P. Kujala, J. Klumperman, E. Anderson, and B. Winckler. *American Society for Cell Biology*. San Francisco, California. (December 2005).

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### PROFESSIONAL SERVICE

Reviewer: *Biological Bulletin, Molecular Biology and Evolution, Zootaxa, Journal of Experimental Zoology Part B: Molecular and Developmental Evolution, Proceedings B, Scientific Reports*

Organizer: Southeastern Ecology & Evolution Conference 2011, Auburn University  
 Member of four-person committee that initiated, planned, advertised, conducted fundraising, and scheduled regional scientific meeting of 200 undergraduate and graduate student participants. The meeting raised over \$5,000 for student scholarships.

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### MEMBERSHIPS IN PROFESSIONAL SOCIETIES

Global Invertebrate Genomics Alliance  
 Society for Integrative and Comparative Biology  
 International Society for Invertebrate Morphology  
 Society for Developmental Biology

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### FIELD EXPERIENCE

- 2015, 2014 *Visiting scientist*, Kristineberg Marine Research Station, Fiskebäckskil, Sweden  
 August 13-23, 2014; August 10-28, 2015
- 2013 *Research crew, R/V Poseidon*, “IceAGE2”. Chief Scientist: Saskia Brix-Elsig. Iceland,  
 July 21 – August 4.
- 2013 *Research crew, R/V Nathaniel B. Palmer*, “Icy Inverts”. Chief Scientist: K.M.  
 Halanych. Antarctica, January 1 – February 9.
- 2011 *Research crew, R/V Meteor*, IceAGE. Chief Scientist: Saskia Brix-Elsig. Iceland,  
 August 27-September 28.
- 2010 *Visiting student*, Friday Harbor Marine Laboratories, University of Washington  
 PI: B.J. Swalla. June 7-August 2.
- 2009 *Research crew, R/V Seward Johnson*, “Siboglinid symbiosis.” Chief Scientist:  
 K.M. Halanych. Gulf of Mexico, October 6-11
- 2009, 2008 *Visiting scientist*, Bermuda Institute of Ocean Sciences,  
 October 22-November 12, 2009; November 16-24, 2008

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### OUTREACH ACTIVITIES

- 2018-2017 *Volunteer presenter*, FUSE (Family Ultimate Science Exploration), Center for  
 Science and Engineering Partnerships, UCSB.
- 2017 *Volunteer Presenter*, I <3 STEM, Conference promoting STEM-literacy for young  
 women in grades 9-12, UCSB.

- 2013 *Invited Speaker*, Science Café, The Gnu's Room Bookstore, Auburn, AL  
Talk title: "Tigers in Antarctica: Auburn Research at the Bottom of the World"
- 2013 *Contributing blogger*, "Icy Inverts Antarctica 2013 Shipboard Blog",  
auburn.edu/antarctica
- 2013-2008 *Volunteer presenter*, AU-Explore science and math open house
- 2013, 2009 *Volunteer presenter*, Ogletree Elementary School, Auburn, AL
- 2012, 2008 *Judge*, South's BEST Robotics Competition, Auburn University
- 2011 *Contributing blogger*, "eXpedition log: IceAGE – M85/3", deepsea-research.org
- 2010, 2009 *Judge*, Undergraduate Research Symposium, Auburn University
- 2008 *Volunteer presenter*, Daughters and Mothers Exploring Science (DAMES)  
program for middle school girls and their mothers, Auburn University