



## Division of Comparative Biomechanics

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### DCB Officers & Representatives

**Sharon Swartz**  
Chair 2011-2013

**Mark Denny**  
Chair-Elect 2011-2013

**Robert Full**  
Past Chair 2011-2013

**Tim Higham**  
Secretary 2012-2014

**Laura Miller**  
Program Officer 2012-2014

**Marianne Porter**  
Student/Postdoc Representative  
2010-2013

**Anna Ahn**  
ICB Editorial Board Representative  
2012-2017

### Message from the Chair

*Sharon Swartz*

Writing this message gives me a great chance to recall the wonderful biomechanics activity I witnessed at the recent meeting in Charleston! It was exhilarating to see so much great science in action - in posters, talks, and conversations in the hallways, from undergraduates, grad students, postdocs and old-timers. The Charleston meeting also highlighted the tremendous diversity of work going on within our Division. We represent such a range of methods and approaches, and bring together people working on virtually every group of organisms under study at SICB. As usual, I came home from the meeting feeling refreshed and recharged after dozens of stimulating conversations and presentations.

So, right at the top of this newsletter, a first pitch for next year's gathering! The SICB gurus predict that the 2013 meeting in San Francisco will be the largest and most successful ever, and you might wish to make travel plans early. Happily, because our contract with the Hilton San Francisco Union Square was negotiated when the economy was at its worst, our room rates will be even lower than in Charleston, so even those who might typically find the city rather pricey can join us for a fantastic meeting. We hope to have more biomechanics papers and posters than ever!

### Membership

Divisional membership is strong, and our current membership stands at 375. Although it's great to know that there are hundreds of members in the Division, our numbers are down somewhat from the last few years, so let me remind all of us to encourage colleagues and students who might have interests in the Division to join us. I particularly encourage you to reach out to potential members who aren't familiar with SICB, especially those outside the biological sciences proper but who have interdisciplinary interests that bring them within our sphere. The excitement of our meeting in San Francisco will be a great way to introduce them to SICB - invite them in once, and I predict we'll have some new members for life.

### Student Prize Competition

Once again, the indefatigable Jake Socha from Virginia Tech served as the judging leader of the DCB Student Prize Competition. He managed to wrangle our panel of judges into observing and evaluating our



dozens of outstanding entries. I want to thank Jake, and the rest of our judging entourage, for their extremely generous donation of time and energy. Rewarding the accomplishments of students is one of the best things we do, but it takes a tremendous amount of time to run an excellent competition of this kind.

We're lucky to have so many members willing to take time out of their meeting to make our student competition such a success.

This year's paper prize goes to William Stewart from the University of California - Irvine for his paper "Zebrafish larvae evade predators by sensing water flow", co-authored with G. S. Cardenas and M. J. McHenry. Honorable Mention goes to Henry Astley for a paper co-authored with A. Haruta and T. J. Roberts, all from Brown University,

for "The Effects of Substrate Compliance on Jump Performance in the Cuban Tree Frog (*Osteopilus septentrionalis*)."

I'll note that I may be the current chair of this Division, but I'm not a judge, so I did not unduly influence results! Brown University just happened to earn

an additional prize this year with Nick Gidmark's poster, "Pharyngeal jaw function in three cyprinid fishes," co-authored with J. Tarrant and E. Brainerd, taking the top prize. "Tailbot - Robot with Inertial Assisted Control by an Active Tail Inspired by Lizards," by Evan Chang-Sui, T. Libby, R. J. Full and M. Tomizuka earned Honorable Mention.

Congratulations to these outstanding students, and to the many others whose work was excellent but whom we were not able to recognize with a prize this year. We already anticipate the Division's largest student competition next year; member-judges, sharpen your e-pencils!

### Symposia

DCB helped to support two creative, highly integrative symposia in Charleston, "Novel methods for the analysis of animal movement: spatial and temporal structure across scale," organized by Doug Altshuler and Michael Dickinson, and "Combining experiments with modeling and computational methods to study animal locomotion," organized by Laura Miller and Silas Alben. Both were extraordinary, and I'm already looking forward to the resulting papers in upcoming issues of *Integrative and Comparative Biology*.

In San Francisco, there are two Society-wide symposia that may be of particular interest to DCB members; "When Predators Attack: Sensing and Motion in Predator-Prey Interactions," organized by Matt McHenry and Stacy Combes, and "Vertebrate Land Invasions: Past, Present, and Future," organized by Alice Gibb, Miriam Ashley-Ross, Richard



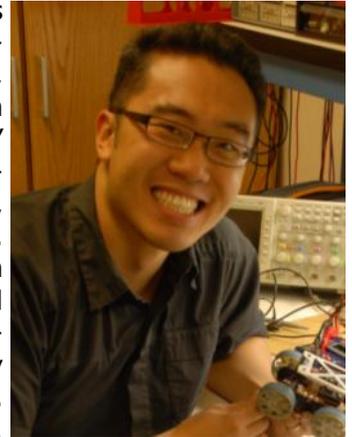
William Stewart



Henry Astley



Nick Gidmark



Evan Chang-Sui



Blob, and Tonia Hsieh. However, none of the eight division-sponsored symposia have DCB sponsorship. Let's make our presence more conspicuous in future meetings! Start thinking now about symposia for the 2014 meeting in Austin; proposals will be due by August 24, 2012. You needn't be a faculty member to bring a proposal forward, and organizing a symposium can be a wonderful experience for postdocs and graduate students. If you're not sure how to proceed to develop a symposium proposal, start with the SICB Symposium Guidelines for Symposium Organizers, <http://www.sicb.org/meetings/symposiaguidelines.php3>, then contact a Divisional Program Officer – ours is Laura Miller, given the wonderful symposium she just ran, I know she'll have great advice for potential proposers.

### **Carl Gans Award**

At the DCB Business Meeting in Charleston, the Carl Gans Award Committee, chaired by Emily Carrington, had the honor of announcing this year's award recipient. This award recognizes Carl Gans' scientific career and editorial contributions to animal morphology, biomechanics, and functional biology. First given last year, it can be awarded for distinguished contributions to the field of comparative biomechanics and functional biology to an investigator within seven years of completion of a doctorate, or for the single best contribution of the past year to the literature of comparative biomechanics and functional biology to an investigator at any career stage.

This recipient of this year's award is Dr. Kelly Dorgan currently a postdoctoral researcher at the Scripps Institution of Oceanography working with Greg Rouse, following her postdoctoral work with Mimi Koehl at UC-Berkeley and her Ph. D. at the University of Maine, where she worked with

Peter Jumars. Kelly's groundbreaking (pun intended? Oh, Steve Vogel infects us all eventually . . .) research concerns the biomechanics and energetics of burrowing in a great diversity of polychaetes.

Kelly has helped to pioneer the study of the mechanics of mud burrowing, showing how burrowing worms propagate cracks through the substrate using elegant experiments, theory, and modeling. Her publications can be found in venues as diverse as *Nature*, *The Journal of Experimental Biology*, *Geo-Marine Letters*, and *Oceanography And Marine Biology - An Annual Review*. She has previously received Association for the Sciences of Limnology and Oceanography Raymond L. Lindeman Award for the Outstanding Paper in Aquatic Science by a Young Scientist, and been listed as one of Popular Science's "Brilliant 10" Young Scientists.

Her letter writers applaud her biomechanical insights, her breadth and depth of knowledge, and her passion for bringing younger student scientists along. One notes, for example, "The mechanical significance of the accomplishments is hard to overstate. Prior to Kelly's work, burrowing studies did not use the material properties of the medium to assess the work of burrowing. That situation is analogous to students of swimming not measuring fluid density and dynamic viscosity in analyzing swimming mechanics and the forces involved. Every new edition of every inverte-





brate zoology text going forward will alter its summary of burrowing based on Kelly's review paper." Another writer comments that "She is an excellent field biologist, and she also designs innovative, clever laboratory experiments to test her ideas. She is fearless about learning new techniques and continues to expand her horizons into new fields."

Carl Gans had a passionate interest in burrowing mechanics in the vertebrate world; I know it would have delighted him to see the Carl Gans Award given to a talented young biomechanician with passion for understanding burrowing in invertebrates - Congratulations, Kelly, and best wishes for 2012!

### **Upcoming conferences**

There are several conferences in the next months that may be of particular interest to our membership.

#### *Society of Experimental Biology*

The Society for Experimental Biology 2012 Annual Main Meeting will take place in Salzburg, Austria from June 29th to July 2nd. Abstract submissions are accepted until Friday, May 4, 2012. The meeting includes General Biomechanics and General Animal Biology sessions, and a special session on Biomechanics of Locomotion in Flocks, Schools and Swarms. The meeting includes prizes for best posters and presentations in the field of biomechanics. More information can be found at <http://www.sebiology.org/meetings/Salzburg2012/Salzburg.html>.

The Society subsidizes attendance at the meeting by students and other young scientists; if you are interested in seeking support to attend, check out <http://www.sebiology.org/meetings/Salzburg2012/grants.html>.

#### *The American Society of Biomechanics*

The 2012 Meeting of the American Society of Biomechanics will be in Gainesville, FL August

15-28. Information is available at <http://hhp.ufl.edu/apk/ces/ASB2012/>.

Grant support is available for students; see <http://www.asbweb.org/html/students/grantinaid.html>.

#### *International Society of Biomechanics*

The next Congress of the ISB, ISB XXIV, will be hosted in Natal, Brazil, Sunday August 4 to Friday, August 9, 2013. See <http://www.isbbrazil.com.br/>.

#### *International Congress on Vertebrate Morphology*

The 10th ICVM will be convened July 8-12, 2013, in Barcelona, Spain. Proposals for symposia are now being accepted, and vertebrate biomechanics topics are certainly appropriate. The ICVM website notes:

"The Scientific Program Committee for ICVM-10 welcomes the submission of proposals for symposia and workshops. They should give an overview of a broad field of (or a method in) vertebrate morphology and should be informative for non-specialists. Speakers should present reviews or overviews rather than highly detailed and specialized research papers, and look toward the future as well as the present."

The deadline for proposals for symposia and workshops is April 15, 2012. For more information, see <http://icvm2013.com/>.

### **Message from the Program Officer**

*Laura Miller*

Many thanks to all who participated in the Charleston meeting this year to make it one of the most successful ever! We were fortunate to have two excellent symposia on biomechanical topics. The first of which was a society wide symposium organized by organized by Doug



Altshuler and Michael Dickinson titled "Novel methods for the analysis of animal movement: spatial and temporal structure across scale." The second symposium was organized by Silas Alben and me on "Combining experiments with modeling and computational methods to study animal locomotion." Both symposia received generous support from NSF IOS, and I would like to thank Bill Zamer and Hannah Carey and for making this possible. In addition to the symposia, there were over 250 presentations and posters related to topics in comparative biomechanics.

The meeting was packed with numerous workshops and socials providing useful information, discussion, and networking. The DCB sponsored events included the DCB/DVM/DEDB Social on Thursday night and the Interface of Math and Biology Workshop on Friday. The highlights of the lively discussion from the interface workshop are available at [http://mathbiointerface\\_forumotion.com/](http://mathbiointerface_forumotion.com/). Please visit the forum to share any useful resources for students and faculty working at disciplinary interfaces. After four full days of the meeting, the society wide social in honor of students and postdocs offered a wonderful opportunity to catch up with friends, grab some drinks and deserts, and say goodbye until next year.

Next year's meeting in San Francisco should be just as exciting with two society wide symposia related to biomechanics: "When Predators Attack: Sensing and Motion in Predator-Prey Interactions," organized by Stacey Combes and Matthew McHenry, and "Vertebrate Land Invasions: Past, Present, and Future," organized by Alice Gibb, Miriam Ashley-Ross, Richard Blob, and Tonia Hsieh. If you plan to give an oral presentation or poster, please choose your abstract topics wisely. The DCB program officer handles abstracts that have Topic #1 under the heading of "E. Morphology." The three topics you choose when you submit your abstract play a huge part in determining the session in which your presentation is placed.

If you have ideas for symposia for the 2014 meeting and beyond, please contact me soon and ideally before August. The deadline for proposals is in August 19, 2012. SICB will reimburse up to \$100 for each symposium presenter if they submit a paper to *ICB* by January 31. Registration, lodging, and travel expenses can be paid from divisional funds (often more than one division) as well as from grants from outside agencies, journals and publishers, and equipment companies. You are encouraged to contact those who have successfully obtained external funding for advice, and we now have a collection of successful proposals that are available to you. If you are considering putting together a symposium, consider adding complementary sessions of oral and poster presentations to expand the range of topics and the number of participants.

### Message from the Student/Postdoctoral Affairs Committee Representative

Marianne Porter

I hope everyone had a great meeting in Charleston. The Public Affairs Workshop, *Distilling your message*, this year was amazing. I realize the meeting is packed with activities and commitments. This Public Affairs Committee puts on workshops aimed at the entire membership and their topics are especially relevant for students and postdocs. Knowing how to distill your scientific message is important at all levels from incoming students trying to carefully articulate their own scientific interests to postdocs explaining research to biologist with varying specialties during a job interview. The Center for Communicating Science at Stony Brook University conducted this workshop. The center's goal is to help scientists communicate effectively with a general audience and non-scientists. Below I will outline a few of the major points covered in the workshop.

1. **Know your audience.** Giving a



talk in a DCB session at SICB is very different from giving a talk to a general audience of biologists during a job interview or giving a senator / reporter / potential advisor a two minute run down (elevator speech) on why your research is important and should be funded.

2. **Find common ground.** When talking about your own research remember the 'curse of knowledge.' You know all the details about your data, experiments, and topics. However, your audience will not know every detail and it is your responsibility to simplify your message and get the big picture across.

3. **What do you do and why does it matter?** You should tell a story stressing the meaning or big picture rather than the details. Also, simplifying your research is not dumbing it down. You should be able to explain why your research is important and what do you do to answer those big questions.

4. **Do not use jargon and be conversational.** This is an excellent opportunity to use anecdotes and analogies for examples.

5. **Cover one or two points that you want your audience to know.** Keep your description simple. You can only expect your audience to learn so much in two minutes, 15 minutes, or 45 minutes.

Finally, the Student/Postdocdoctoral Affairs Committee workshop (Titled: Maximizing Your Potential through Job Applications and Interviews) was well received. Undergraduates, Masters students, PhD students, and postdocs all attended and hopefully got something out of the time we spent together. We are looking for ideas for next year. If you have any ideas for a good topic for San Francisco 2013, please email me and let me know ([meporner@vassar.edu](mailto:meporner@vassar.edu)).

### Message from the Secretary

*Tim Higham*

I first want to thank Miriam Ashley-Ross for her incredible dedication and contributions as DCB's sec-

retary since assuming office at the 2008 meeting. It goes without saying that DCB would not be remotely as successful if it weren't for Miriam. Thanks! I will do my best to live up to the high bar that Miriam has set over the past few years!

Like many of you, I was incredibly impressed and excited by the meeting in Charleston. Comparative biomechanics was everywhere! There were many stunning talks and posters, including topics ranging from pitch control in robots to tongue projection in salamanders. The quality of the talks and posters highlights the current state of DCB. In terms of membership, there were 375 members as of February of this year, which constitutes approximately 10% of the total membership of SICB. Looking forward, I am extremely excited about the meeting in San Francisco, which will be held at the Hilton San Francisco Union Square.

Now that I am officially the secretary, I would like to push forward on a few different objectives. First, the website is in need of repair. The content is getting old and needs a breath of fresh air. I am working on a significant overhaul, but I need your help! Our researcher database could be expanded and altered in order to attract people to our division, attract students and postdocs to your lab, and share your general interests with the scientific community. Rather than simply asking everyone to contribute, I will create new ways of getting your information on the site. The other major addition is a video database, which is outlined below.

#### **Video database**

Comparative biomechanics not only utilizes, but relies upon, high quality video, whether it's to capture the feeding strike of a mantis shrimp (over 400,000 views;)

<http://www.youtube.com/watch?v=aAu2f87QAQU>, the feeding strike of a boga fish (over 150,000 views;)

<http://www.youtube.com/watch?v=WOQ3US92Tt0>, or the jumping motion of a frog (over 130,000 views;)

<http://www.youtube.com/watch?v=yKpJElwama8>.

In addition to garnering interest from other scientists, these videos capture the imagination of the general



public. I can't think of a better way of getting a child interested in biomechanics! In addition, these videos can be a teaching resource at all levels. It is my goal to develop a DCB YouTube channel where researchers can share their exciting videos. A central location will make it easy for other scientists to locate that key example that they are looking for. Please contact me ([thigham@ucr.edu](mailto:thigham@ucr.edu)) if you have any ideas or if you would like to share particular videos. I will send out a general announcement shortly.

### **Wikipedia Project**

*Henry Astley*

Since its inception in 2001, Wikipedia has become the first stop for online information on everything from quantum physics to Family Guy episodes, and topics in comparative biomechanics are no exception. Wikipedia pages are the first Google result for muscle, suction feeding, insect flight, and many other topics, with monthly page views ranging from a few hundred (for reflexes) to almost 120,000 (for muscle). These pages are the first, primary, or only contact many members of the public will have with our work, and represent a tremendous outreach opportunity. While some pages are in fairly good shape, others are short, error-prone, or simply non-existent – the coverage of suction feeding amounts to a few sentences, while the mechanics of bat flight are not covered at all. In hopes of remedying this situation, I created the Organismal Biomechanics Wikiproject, intended to be a hub for coordinating improvements on various articles and helping contributors.

Academic contribution to Wikipedia is slowly moving from a rarity to the norm. Faculty members contribute directly, as well as assigning the improvement of Wikipedia pages to classes. The Society for Neuroscience, the American Psychological Society and the American Sociological Society have all embarked upon "Wikipedia Initiatives" aimed at improving the quality of articles related to their field, and PLoS Computational Biology published an article on contributing to Wikipedia.

But even one person can make a huge difference during their lunch break, with the information they know off the top of their heads. Edits can be

made without even registering an account – just click either the "edit" at the top right of the page or, for articles with sub-sections, the "edit" at the top of the section of interest, and start typing. References can be added with <ref>...</ref> tags, or just paste in the URL and one of the autonomous programs ("bots") will format it for you later. I keep watch over all the articles in the scope of the Organismal Biomechanics Wikiproject, preventing vandalism and helping format and integrate contributions, and am available either via the "talk" page of my userpage or the "talk" page of the Organismal Biomechanics Wikiproject. In some case, even adding a few sentences or fixing an error can drastically improve the article, helping showcase your favorite area of research to hundreds or thousands of visitors per year. Contributing to this accessible resource will broadly impact the general understanding of comparative biomechanics.

### **Minutes of the DCB Business Meeting, January 4, 2012, Charleston, SC**

[Click here for PDF file on www.sicb.org](http://www.sicb.org)

### **Election—Candidate Biographies**

Candidates for Chair-Elect

#### **Matt McHenry**

**Current position:** Associate Professor

**Education:** B.A. in Biology and Art, Vassar College ('95), Ph.D. in Integrative Biology, UC Berkeley ('02)

**Professional experience:** Postdoctoral Researcher, Harvard University (2002-





2004). Postdoctoral Researcher, University of Groningen (2004-2005). Assistant to Associate Professor of Ecology and Evolutionary Biology, U.C. Irvine (2005 – present).

### **SICB activities:**

1. Contributed and invited presentations. At least one presentation in 17 of the past 19 annual meetings. In the past 5 years, I served as an author on 22 presentations.
2. Committee Member. Student grant-in-aid of research, Best Student Paper Competitions for DVM and DCB.
3. Committee Chair for the Best Student Paper Competition of DCB.
4. Symposium organizer. Co-organized "Sensory Biomechanics" (2009, Boston) and "When Predators Attack" (2013, San Francisco).
5. Winner of student presentation awards. DIZ Best Student Paper ('98), The Andrian Wenner Strong Inference Award ('00) & The Dwight Davis Award, DVM ('02).

**Other memberships:** Society for Experimental Biology, The American Physiological Society, the International Society for Neuroethology & Sigma Xi.

**Research interests:** The biomechanics and sensory biology of animals. Recent research has focused on predator-prey interactions in fish.

**Goals statement:** Biomechanics has exploded at the SICB annual meetings in the past 15 years. Guided by our senior leadership and fueled by the recruitment of great young minds, SICB has become the top annual event in the world for comparative biomechanics.

I am interested in how DCB can build on this momentum to function as a home for comparative biomechanics outside of our annual meetings. In particular, the development of online resources could allow us as a community to collaborate better in areas such as graduate recruitment, outreach, and the development of research techniques and software. Websites, social media, blogs and wikis are easily created, but are even easier to ignore in our busy work life. However, if highly useful and designed for growth, these tools

can become indispensable resources.

Therefore, if elected DCB Chair, my dual aims would be to maintain the present functions of the division while exploring how we may expand the resources that we offer our members.

### **Melina Hale**

#### **Current position:**

Associate Professor, Dept. of Organismal Biology and Anatomy, Committees on Neuroscience and Computational Neuroscience, University of Chicago. Research Associate, Field Museum of Natural History.

#### **Education:**

Duke University, B.S. 1992; University of Chicago, Ph.D. 1998; SUNY Stony Brook, Postdoc. 1998-2001.

#### **Professional experience:**

Grass Fellow, Marine Biological Laboratories, Woods Hole. 2000. Fellow, Defense Science Study Group, Institute for Defense Analysis 2006-2008. National Academies Education Fellow 2009-2010. Attendee of AAAS Vision and Change in Undergraduate Education Conference and undergraduate STEM (science, technology math and engineering) conferences. Member of the Board of the University of Chicago Press 2011-2014. Panelist/Reviewer NSF and NIH: including regular research grants in Integrative Organismal Systems, as well as EFRI and IGERT programs. PI and Director of NSF's moto-IGERT program for Integrative Training in Motor Control and Movement. This program sponsors graduate students from The University of Chicago and Northwestern University in integrative biomechanics neurobiology and related topics. Regular outreach with girls through the nonprofit Project Exploration (2001-2012). Scientific Content Advisor, Biomechanics exhibit being developed at the Field





## SICB Newsletter

Spring 2012 Issue

Museum of Natural History (to open 2014).

opportunities in STEM education.

**SICB activities:** Editorial Board *Integrative Biology* 2005-2010. Nominating committees and student presentation judging committees for DVM. Participant in symposia on Neuromechanics (2006) and symposium honoring Steven Vogel (2007)

**Research interests:** My research broadly examines the mechanics and neural control of limb and axial body movement. I am particularly interested in how neuromechanical systems change through development and evolution while maintaining functionality for the organism. While some animals use periods of inactivity, as during metamorphosis, to substantially modify their body plan and movements, others must generate effective behaviors throughout periods of significant morphological and functional transformation. On broader time scales, the diversity of body forms and behaviors we observe required substantial coevolution of the nervous system and peripheral structures. My lab addresses the goal of understanding the processes by which mechanical systems change and adapt in concert with changes to neural architecture and function with biomechanical, physiological and morphological approaches.

**Goals statement:** The Division of Comparative Biomechanics has rapidly become an important home for the biomechanics community and an integrative bridge across Divisions at SICB. It has been exciting to be a part of DCB as it has taken form since 2008 and to consider how it can further develop in the coming years. Continuing to support DCB's core areas while highlighting new research directions and interfaces with other fields are key as are continued efforts to encourage new members from both biological and engineering backgrounds. One of the best things about SICB is that students and postdocs play a major role in the Society, I am committed to continuing to increase the diversity of and support for our junior members. I am also particularly interested in the role DCB can have in education and outreach. The need of science curricula to bridge from biology to mathematical and computational sciences is a focus of national discussions on education. DCB, through the collective experience and interests of its members, is well positioned to provide informed input to this conversation and to be involved with efforts to create and improve