

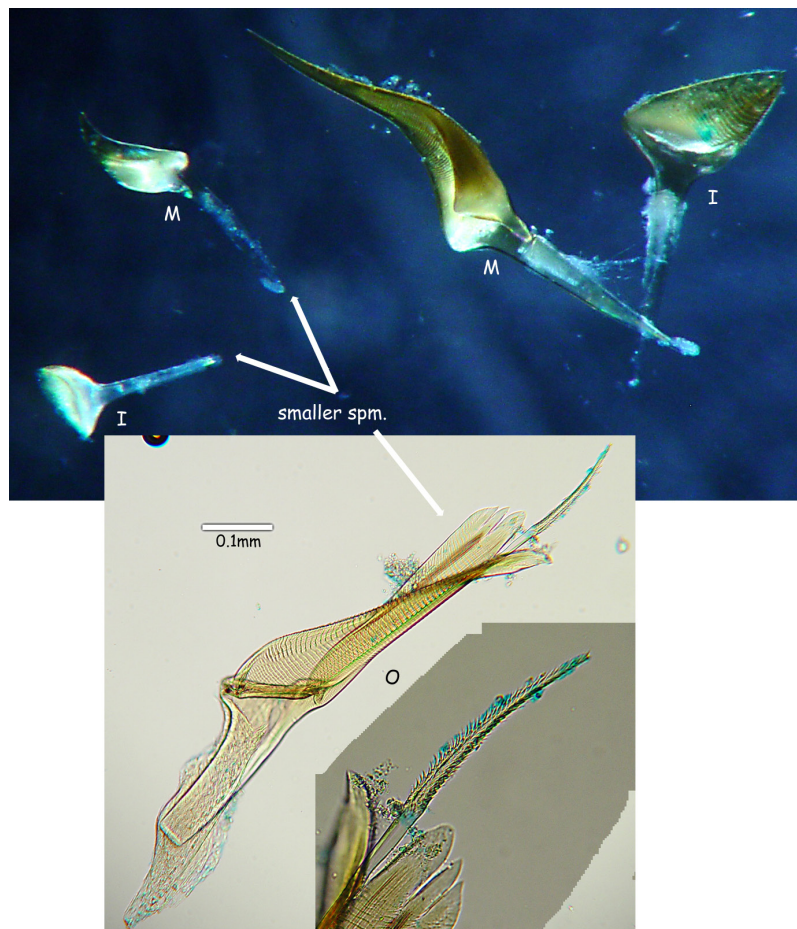
# SOUTHERN CALIFORNIA ASSOCIATION OF MARINE INVERTEBRATE TAXONOMISTS



July–August, 2016

SCAMIT Newsletter

Vol. 35 No. 2



*Neosabellaria cementarium* - opercular crown palae arranged in three concentric rows: outer (O), middle (M) and inner (I) palae.  
CSD Sta. 2031(2), 29JUL2005, 52m.  
- K. Barwick

## This Issue

JULY 2016 .....	2
29 AUGUST 2016, THE FAILURE OF DNA BARCODING, SCCWRP .....	2
BIBLIOGRAPHY .....	6
SCAMIT OFFICERS .....	7

The SCAMIT newsletter is not deemed to be a valid publication for formal taxonomic purposes.

Publication Date: February 2017

---

**JULY 2016**

---

There was no July 2016 SCAMIT meeting.

**29 AUGUST 2016, THE FAILURE OF DNA BARCODING, SCCWRP**

**Guest Speaker,** Kirk Fitzhugh,  
NHMLAC

**Attendees:** Carol Paquette (MBC);  
Kelvin Barwick, Laura Terriquez,  
Danny Tang, Mike McCarthy  
(OCSO); Greg Lyon (CLA-EMD);  
Katie Beauchamp, Gabe Rodriguez,  
Ron Velarde (CSD); Leslie Harris (NHMLAC); Larry Lovell (LACSD); Dean Pasko, Tony  
Phillips (Private Consultants); Doug Foster (TheLab)

**Remote Attendees:** Don Cadien, Bill Furlong (LACSD), David Villas (MBC); Wendy Enright,  
Ricardo Martinez-Lara, Megan Lilly, Veronica Rodriguez (CSD); Angela Eagleston (WADOE);  
Paul Valentich-Scott (SBMNH)

**UPCOMING MEETINGS**

Visit the SCAMIT website at: [www.scamit.org](http://www.scamit.org) for the  
latest upcoming meetings announcements.

**Business:** A General Membership Meeting will be held September 13<sup>th</sup> at SCCWRP. SCAMIT Officers will provide their annual updates, as they do for typical Executive Committee Meetings, which will be followed by a special general meeting to discuss the future direction of SCAMIT. Larry asked for meeting topics for the October meeting and then announced the next International Polychaete Conference (IPC 13) will be at Cal State Long Beach (CSULB), Aug 4-9, 2019.

Kelvin mentioned that the Pyramidellidae listing in Ed 11 has changed considerably, therefore this is a topic that needs resolution. There are many provisional species some of which have been assigned to described species. Kelvin referred the discussion to Tony who has been working with Pat Lafollette to make these assignments. Tony mentioned that he could not meet in October, but volunteered for a November meeting on Pyramidellidae, with a date to be determined.

Larry mentioned that if specimens were going to be reviewed, SCCWRP would be a good meeting location as they have a microscope that can broadcast live views, allowing those who are attending remotely to participate. If that system were to be made available, and actually functional, it would go a long way to meeting one of the most highly requested meeting changes that came out of the recent SCAMIT Survey.

With a little additional urging, Kelvin was roped into hosting the October meeting. This will take place on Tuesday, October 11<sup>th</sup> at the Orange County Sanitation District (OCSO). The topic will be a review of material from members' gastropod notebooks, with perhaps some updating of the SCAMIT toolbox if time permits.

Regarding the meeting schedule, Leslie asked if we should have a December meeting. Larry mentioned that the Bight'18 planning will be on the horizon and there may be a proposal to discuss taxa that are in need of resolution. Also, labs that are going through taxonomic training could use the December, or other upcoming SCAMIT meetings, to bring taxonomic issues to the table for discussion. A lot of information and insight can be exchanged without a formal presentation or workshop, but rather by sitting around the table and sharing about problematic taxa. In some cases a topic is all that is needed.



Larry announced that Kelvin Barwick is the most recent grant recipient from the SCAMIT publication fund. Kelvin received the grant for a paper he co-authored (Safonova 2016) describing a new species of *Policordia*. Larry used that announcement to transition to a review and reminder about the SCAMIT publication grant program.

Following the business portion of the meeting, Larry introduced Dr. Kirk Fitzhugh. Kirk got his PhD in polychaete systematics from the late Kristian Fauchald, and eventually came to the Natural History Museum of Los Angeles County in 1990 as Curator of the polychaete collection. Kirk's current research passion focuses on the philosophy of systematics.

Kirk then took the floor and introduced his presentation: *The epistemic failure of DNA barcoding*, which began with some background on barcoding and his perspective of the species concept.

He started out his overview by noting that the explosion of barcoding in systematics research is in part a result of a “bandwagon” trend. He pointed out that many researchers have jumped onto the barcoding bandwagon and applied the method without a clear understanding of the principles of scientific inquiry and their correct application. Kirk opined that by doing so, we're no longer teaching science as a method, rather we're teaching science like we teach medicine. In essence, for this problem one prescribes barcoding as the solution, rather than asking the appropriate questions, formulating hypotheses, and testing the hypotheses. Barcoding has become to systematists what the Sirens were to Odysseus, and that one needs to be a little wary of running astray with the blind application of the method.

In early days DNA barcoding was described as a method for “identifying” species. Even as recently as 2012, barcoding was defined in the glossary of a textbook “as a method for identifying species”. Kirk, on the other hand, describes barcoding as a “technology-driven” science.

The first question one must ask is: What are Taxa? (including species). This is the fundamental question that all systematists seem to avoid answering. Kirk offered the following definition: *Any of a set of classes of hypotheses used in biological systematics for the purpose of explaining particular characters of observed organisms*. In general this means that taxa are inferential reactions to our observations of organisms. Taxa are explanatory hypotheses, not things, entities or individuals, thus... species are also explanatory hypotheses, and cannot be identified or delimited! One observes individual organisms, not species.

Kirk argued that as taxonomists we take our background knowledge, make our observations of structures and such things that are in need of explanation, and generate a hypothesis: such as a species hypothesis. Such abductive reasoning – the inferences of explanatory hypotheses – is our most commonly used reasoning. We use it on a daily basis.

*What are species?:* Are they classes or individuals? They are neither. What we observe are in fact, semaphoronts: the state of the individual organism at the moment in time at which you are observing it. Semaphoront is a term introduced by Hennig (1966) in his book *Phylogenetic Systematics*, which introduced the idea of cladistics analysis.

Kirk offered up his preliminary definition of species that has taken many years, and a path of many more iterations: *An explanatory account [hypothesis] of the occurrences of the same character or characters among gonochoristic or cross-fertilizing hermaphroditic [sexually reproducing] individuals by way of character origin and subsequently fixation during tokogeny.*



With this concept of a species defined, he began his argument against the use of DNA barcoding of a nucleotide sequence for the purposes of identifying a species. One cannot identify species via DNA barcoding because species are not things or class constructs. Species, like all taxa, are explanatory hypotheses. A nucleotide sequence is a set of characters of a semaphoront, a point in time in the ontogeny of an individual. It is little more than the characters one can use to communicate their observations of individuals at a given point in time.

Kirk cited the Kongshavn et al (2016) IPC conference presentation by way of example. They performed a 3-year study comparing barcoding identifications to morphologic identifications and found little agreement. [Experiences after three years of automated DNA barcoding of Polychaeta. Abstract, 12<sup>th</sup> International Polychaete Conference, National Museum Wales]

Kirk's presentation was elegant and I cannot adequately represent it in total here. However, I would summarize his argument as follows: Kirk is stating that reducing a "species" or "taxa" to a genetic sequence is not an appropriate representation or explanation of a species-level hypothesis, because one is not considering that we don't know the causal relationships between the sequence and the expression of the sequence. So trying to relate individuals to the hypothesis of what constitutes a species without an understanding of what the sequence represents (physically) is misleading and inaccurate. The process does not follow the principles of scientific inquiry. Consequently, one cannot use a nucleotide sequence to 'identify' species, and one should not use nucleotide sequences as characters to construct cladograms without a clear understanding of what is required to explain individual nucleotides, how those nucleotides are causally related to phenotypes in the organism, and how characters change with ontogeny.

In conclusion, Kirk mentioned that he would gladly share electronic versions of the various research papers that he has written on this subject or some of the seminal articles that he used in the formulation of his ideas on barcoding and cladistic analysis. A Dropbox link to his philosophically-oriented papers is provided below. Among the papers are several recent polychaete works in which we have treated taxa as explanatory hypotheses.

<https://www.dropbox.com/sh/gx7jqgxw076xiv4/AAA29e-xqyGP5Ue4xwpXAB4ha?dl=0>.

Following the presentation there was a brief but lively debate about the use of genetic methods in other applications. Kirk explained that he was not arguing against the use of barcoding as a tool, but that the tool is being applied without regard to scientific methods to questions of phylogenetic analysis and inferences of species hypotheses.

After lunch, Larry jumped into the review of Ed 11 and began a discussion of the emend list to correct errors or omissions that have already been discovered by LACSD staff. Larry mentioned his discussion with Chris Beagan and the State regarding State funding for the SCAMIT database.

Page 38-39: *Lottia coniz* and synonyms need to be addressed

Page 99: *Nephtys* is misspelled and *Sphaerodoridium* has an extra "r" in it

Page 100: Kravits is misspelled with an s instead of a z.

Page 101: chamberlin is misspelled

Page 96: Ørsted with a Ö in WoRMS vs Ø in SCAMIT





Next up Leslie gave a presentation on the 12<sup>th</sup> International Polychaete Conference at the National Museum Wales, Cardiff, including pictures of the museum where the conference was held, the gift bag & its swag (including rain ponchos to withstand the inclement weather), the mid-week excursion, etc. The meeting had nearly 200 attendees. Local SCAMIT members Larry, Leslie, Kirk, and Karen Green were in attendance. Kirk did a week-long pre-conference workshop on *Philosophy of Biological Systematics* and provided a plenary talk similar to the one given at today's meeting. Larry, Kirk, and Leslie were sole authors or co-authors on 2 talks and 6 posters. On behalf of Don Reish, an organizing committee led by Bruno Pernet (CSULB), presented a bid to host the 13<sup>th</sup> International Polychaete Conference in Long Beach in 2019. Although it was the only bid it was enthusiastically accepted by the membership. Bruno and a number of SCAMIT members are on the committee. The Queen Mary, The Westin Long Beach, and the Marriot Courtyard, have submitted bids to host the conference. Leslie described the many issues to be considered, such as the mid-week excursion, workshops, registration fees, etc.

Leslie then passed around a flashdrive with pdfs of the meeting proceedings and abstracts, as well as pictures of a number of posters. One great new feature instituted by the Cardiff organizers is a page with downloadable pdfs of the posters that were on display. The Cardiff posters can be found here: <https://museum.wales/Posters/>

Below is a listing of posters/presentations involving SCAMIT members:

- Lovell, L.L., Fitzhugh, K., Harris, L.H. Taking a closer look: a SEM review of *Levinsenia* (Paraonidae)
- Fitzhugh, K. A solution to going down the rabbit hole of systematics [plenary talk]
- Harris, L.H. 4 new and 1 revalidated species from California (Polychaeta)
- Tovar-Hernandez, M.A., Harris, L.H. Sabellids from the Chukchi Sea, Alaska (Sabellidae)
- Sivadas, S.K., Harris, L.H., Carvalho, R., Ingole, B. Standardizing Polychaete taxonomy for the improvement of marine ecology and conservation studies on the Indian subcontinent
- Sivadas, S.K., Harris, L.H., Carvalho, R., Ingole, B. The status of marine polychaete research in India
- Keppel, E., Chang, A., Marraffini, M., Harris, L.H., Ruiz, G. NIS Surveys: Polychaete diversity in San Francisco Bay, California (USA) (talk)
- Nogueira, J., Fitzhugh, K., Hutchings, P., Carrerette, O. A new hypothesis of phylogenetic relationships within the polychaete family Telothelepodidae (Annelida, Terebelliformia)

Leslie (and Kirk) noted that the conference was loaded with talks and posters on molecular techniques in phylogeny. Leslie added that it was very apparent that morphological techniques of relating taxa were fading rapidly, as are the individuals who practice them.

Leslie also mentioned several presentations of note, specifically a proposed redefinition of *Pista*, a discussion of widely distributed species, reviews of Cossuridae and Magelonidae, and next generation histology and meta-DNA.



**BIBLIOGRAPHY**

- Hennig, W. 1966. *Phylogenetic Systematics*. Translated by D.D. Davis and R. Zangerl. Univ. of Illinois Press, Urbana and Chicago. 263 pp.
- Kongshavn et al. 2016. Experiences after three years of automated DNA barcoding of Polychaeta. Abstract, 12<sup>th</sup> International Polychaete Conference, National Museum Wales.
- Safonova, L., and K. Barwick. 2016. A new species of the genus *Policordia* (Bivalvia, Verticordioidea, Lyonsiellidae) from off the coast of southern California.



Please visit the SCAMIT Website at: [www.scamit.org](http://www.scamit.org)

### SCAMIT OFFICERS

If you need any other information concerning SCAMIT please feel free to contact any of the officers at their e-mail addresses:

President	Larry Lovell (310)830-2400X5613	<a href="mailto:llovell@lacsds.org">llovell@lacsds.org</a>
Vice-President	Leslie Harris (213)763-3234	<a href="mailto:lharris@nhm.org">lharris@nhm.org</a>
Secretary	Dean Pasko (858)395-2104	<a href="mailto:deanpasko@yahoo.com">deanpasko@yahoo.com</a>
Treasurer	Erin Oderlin (310)648-5477	<a href="mailto:erin.oderlin@lacity.org">erin.oderlin@lacity.org</a>

The SCAMIT newsletter is published every two months and is distributed freely to members in good standing. Membership is \$15 for an electronic copy of the newsletter, available via the web site at [www.scamit.org](http://www.scamit.org), and \$30 to receive a printed copy via USPS. Institutional membership, which includes a mailed printed copy, is \$60. All correspondences can be sent to the Secretary at the email address above or to:

SCAMIT  
PO Box 50162  
Long Beach, CA 90815