



# Electric Fish Virtual Meeting

Thursday, July 30, 2020

10 am to noon EDT US & Canada (UTC-4:00)  
via zoom

## PROGRAM

10:00 - 10:10 AM Opening Remarks

10:10 - 10:40 AM Dr. Jan Benda, Universität Tübingen, Tübingen, Germany  
Title: Uncovering the secret lives of electric fish.



Electric fish are an exotic but well known model organism for neurophysiological studies at the cellular level because of their unique electric behaviors in the immobilized fish. Despite this we know surprisingly little about their natural behaviors - mating, breeding, territoriality, social interactions, communication, etc. Recent technological progress, however, makes it possible to observe electric fish in their natural habitats. With arrays of electrodes we can observe how these fish move and communicate. But also simple and short recordings with fishfinders - analyzed appropriately - reveal many details of the secret lives of electric fish. In my talk I briefly introduce the methods we are developing for analysing EOD recordings of wave and pulse fish, present a few findings from our recent field recordings, and sketch my vision on citizen science field research on electric fish behavior and ecology.

10:40 - 11:10 AM Dr. Laura Quintana, Instituto de Investigaciones Biológicas Clemente Estable, Montevideo, Uruguay



Title: Regulation of territorial aggression in a weakly electric fish: the role of brain sex steroids.

Understanding the steroid modulation of aggression has gained novel insight by focusing on aggressive behavior uncoupled from the breeding season. *Gymnotus omarorum*, a weakly electric fish, is a seasonal breeder with year-long territorial aggression. Natural spatial distribution shows that territory size is sexually dimorphic and depends on gonadal hormones in the breeding season, and is independent of sex but determined by body size in the non-breeding season. In line with this, in laboratory settings non-breeding territorial aggression is sexually monomorphic, and outcome depends only on body size. This behavior is independent of gonadal hormones but shows a strong dependence on fast-acting estrogens. Quantification of plasmatic and brain steroids, as well as brain gene expression studies, show that neurosynthesized estrogens are the forefront modulators of aggression. This teleost model reveals a role of brain estrogen in the control of non-breeding aggression, a common strategy among distant vertebrate species.

11:10 - 11:40 AM Dr. Harold Zakon, The University of Texas at Austin, Texas, USA  
Title: The Case of the Missing Sodium Channel: a molecular mystery partially solved.



As the two groups of weakly electric fish independently evolved electric organs from muscle, a muscle-expressing voltage-gated sodium channel gene lost its expression from muscle and gained it in the EO independently in both lineages; this was the first step by which this gene became specialized for generating electric communication signals. We identified the molecular basis for selective sodium channel gene expression in vertebrate muscle and discovered the processes responsible for its loss of expression from muscle in gymnotiforms. Intriguingly, these same processes did not occur in mormyrids showing that different evolutionary paths may lead to the same end result. Further detective work will be necessary to solve the "mystery of mormyrid muscle."

11:40 AM - 12:00 PM Open Forum - Organizational Group Discussion  
(topics to be discussed: launch of the efish monthly virtual seminar series, collaboration tools, etc.)

**Hope to see you then!!**

**NOTE:** zoom link will be sent via efish email list just before the meeting. If you are not in the efish email list and wish to be added to it, please email us at [efishlisbon2020@gmail.com](mailto:efishlisbon2020@gmail.com)

ORGANIZING COMMITTEE:  
KENT DUNLAP (Trinity College, USA),  
VIELKA SALAZAR (Cape Breton University, Canada) &  
ANA SILVA (Universidad de la República, Uruguay)