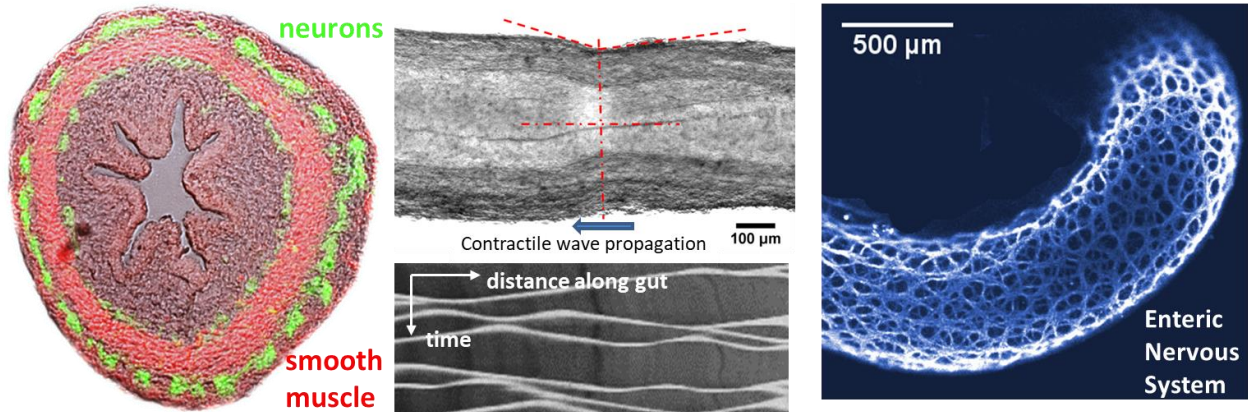


Physical Organogenesis of the Gut



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Lab interests, project description :

We work on physical embryogenesis, which is the study of how mechanical or electrical fields generated within the embryo influence, guide and control its development. This line of research is strongly interdisciplinary, it involves physics, developmental biology, physiology, genetics and medicine. We work on the development of a particular organ, the gut, a phenomenological gold mine. Our work is experimental and carried out on chicken and mouse embryos.

Current topics developed in the lab include 1°) how physical forces [1,2] and bioelectricity [3] affect embryonic gut development, 2°) how the intrinsic innervation of the intestine (the enteric nervous system) wires up during embryonic development and controls digestive peristaltic movements [4–6], 3°) how neural crest cells [7] migrate in the embryonic gut to give rise to the enteric nervous system [8] – migration defects result in an ill-understood pathology, Hirschsprung disease, 4°) dysmotility of uterine peristaltic activity in a very widespread disease, endometriosis [9].

We are currently looking for talented and motivated students to join us in this research venture. The work could be pursued as a PhD. This internship will offer the possibility to develop strong experimental and analytical skills in biophysics and embryology: dissection, biomechanical testing, organ culture, electroporation, electrophysiology, tissue staining, microscopy (optical, time-lapse, confocal, calcium imaging, second harmonic generation, light sheet microscopy etc.), image analysis & computational methods (ImageJ, Matlab). Applications from students with various backgrounds will be considered (e.g. medicine, physics, physiology, biophysics, biology).

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