

Postdoctoral Research Fellows (Ph.D.) -- Visual Neuroscience – University of Houston College of Optometry, TX.

Several full-time postdoctoral positions are available in the laboratory of Christophe P. Ribelayga at the University of Houston School of Optometry, in Houston, TX. The successful candidate(s) will joint one of the following projects:

- a BRAIN initiative funded project. The goal of this project is to develop a combined approach to image gap junction connectivity in EM datasets and, in addition, to estimate the size, strength, and plasticity of gap junctions. The project will involve morphological and physiological studies in mouse and monkey retinas and advanced data analysis and computational modeling. This is a collaborative project with the laboratory of Stephen C. Massey at the University of Texas McGovern Medical School, and the laboratories of Dr. Catherine Morgans and Sue Aicher at the Oregon Health & Science University.
Key words: gap junctions, structure-function, Cx36, focused ion beam SEM, confocal microscopy, 3D-reconstruction, mouse retina, macaque retina, photoreceptors.

- NIH/NEI funded projects on the structure, plasticity, and function of the rod/cone gap junction. The rod/cone gap junction is the entry of the secondary rod pathway--an important functional pathway in the retina. We have developed new genetic models*, and use a combination of biochemical and physiological approaches to identify a) the function of the rod/cone pathway in retinal circuitry and visual behavior, and b) the impact of rod/cone electrical synaptic plasticity on the activity/function of the secondary rod pathway. This is a collaborative project with the laboratory of John O'Brien at the University of Houston.

*new mouse models include: cone-specific Cx36 cKO, rod-specific Cx36 cKO, Cx36 phosphomimetic lines (photoreceptor specific or retina specific knock in)

Key words: rod/cone coupling, Cx36, immunofluorescence, confocal microscopy (Zeiss LSM800 + airyscan), 2-photon microscopy, whole-cell patch-clamp recording (single or pairs of photoreceptors), rod single-photon responses, light entrainment of circadian locomotor activity rhythms, pupillary light reflex, electroretinography recordings.

The ideal candidates will have a strong background in visual neuroscience or related field. Completion of the PhD degree is required before the start date. Computational background, programming experience, and/or experience with neurophysiology will be a plus. The positions will be an initial appointment for one year, with the option to renew annually for 3-4 years. The vision community at the University of Houston (<https://www.opt.uh.edu/>) and at the University of Texas at Houston (<https://med.uth.edu/ophthalmology/>) offers excellent facilities, an outstanding interdisciplinary scientific environment, a strong vision community and a very collegial atmosphere. Houston is an affordable city and is widely considered one of the most diverse cities in the US.

Please send CV, statement of research interests and the names of three references to Christophe P. Ribelayga (cpribela@central.uh.edu)

Recent publications:

Jin, N., Zhang, Z., Keung, J., Youn, S.B., Ishibashi, M., Tian, L.-M., Marshak, D.W., Solessio, E., Umino, Y., Fahrenfort, I., Kiyama, T., Mao, C.-A., You, Y., Wei, H., Wu, J., Postma, F., Paul, D.L., Massey, S.C., and Ribelayga, C.P.: Molecular and functional architecture of the mouse photoreceptor network. *Science Advances*, 6:eaba7232, 2020.

Ishibashi, M., Keung, J., Morgans, C.W., Aicher, S.A., Carroll, J.R., Singer, J.H., Li, J., Li, W., Fahrenfort, I., Ribelayga, C.P., and Massey, S.C.: Analysis of rod/cone gap junctions from the reconstruction of mouse photoreceptor terminals, under review (BioRxiv doi: <https://doi.org/10.1101/2021.09.06.459091>).

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