Photic and non-photic modulation of the mammalian circadian clock

Oosterhout, F.F.T.O. van

Throughout the animal kingdom, species have evolved an internal time-keeping system, referred to as a 'biological clock'. This internal clock allows anticipation to profound, but largely predictable, environmental day-night changes on earth. The biological clock drives 24h-rhythms in physiology and behaviour, and aligns the endogenous rhythms to the external solar day in a close temporal relationship. Being in synchrony with the environmental light-dark cycle allows the organism to cope adequately with daily changes in food availability, ambient temperature, the presence of predators, mating opportunities and/or social interactions. Additionally, the biological timing system has a major function in the regulation of seasonal rhythms, for instance in reproduction, animal migration and fur change.

In order to be of functional use, the biological clock needs to be adjusted to the 24h cycle of the environment on a daily basis. The most important stimulus to regulate the synchronisation is light, which is detected via specialized eye pigments. Apart from light (photic stimulus), the biological clock is also responsive to non-photic stimuli, such as behavioural activity and pharmacological agents. The research described in this thesis examines how photic and non-photic cues modulate the activity of the biological clock.

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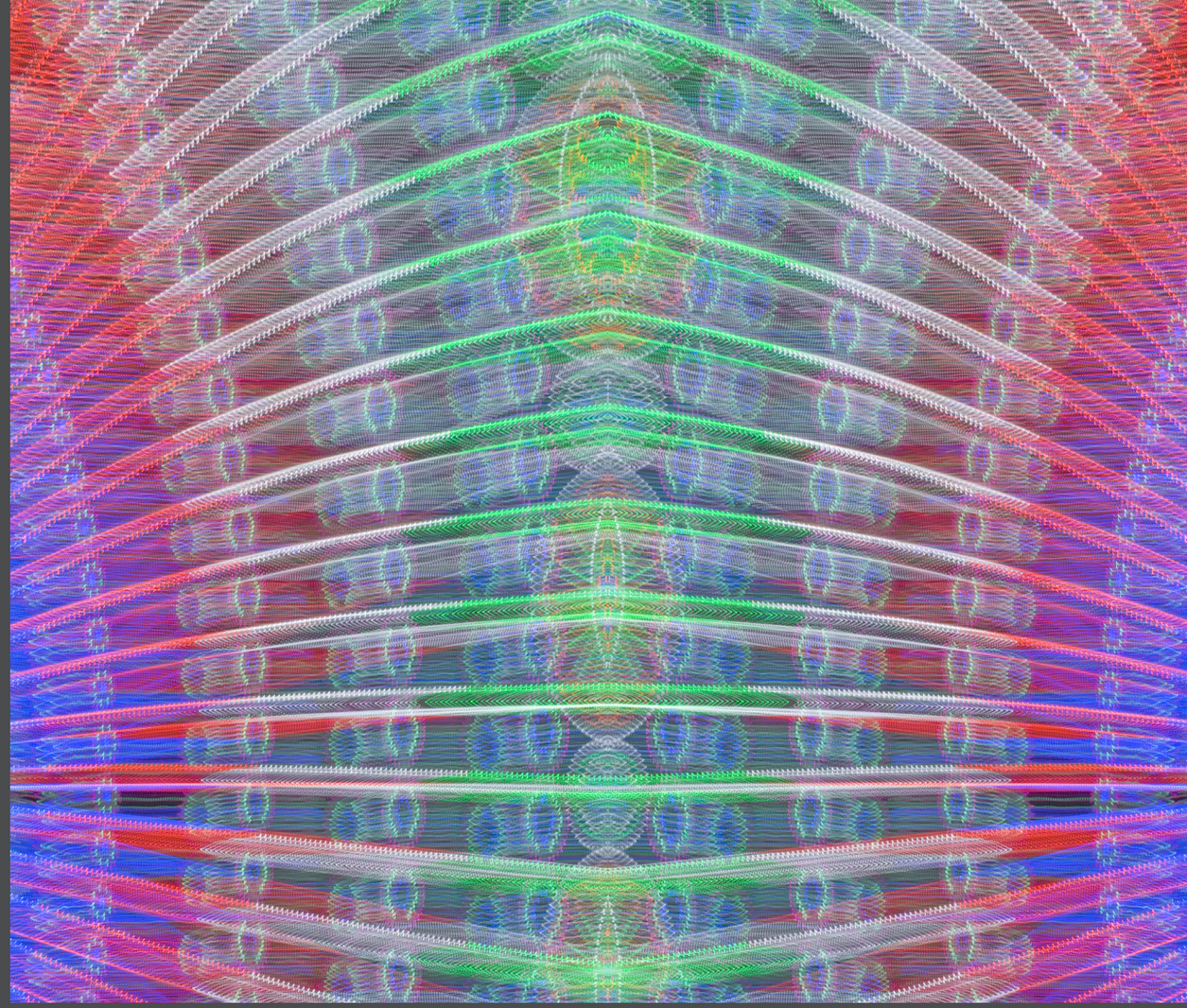

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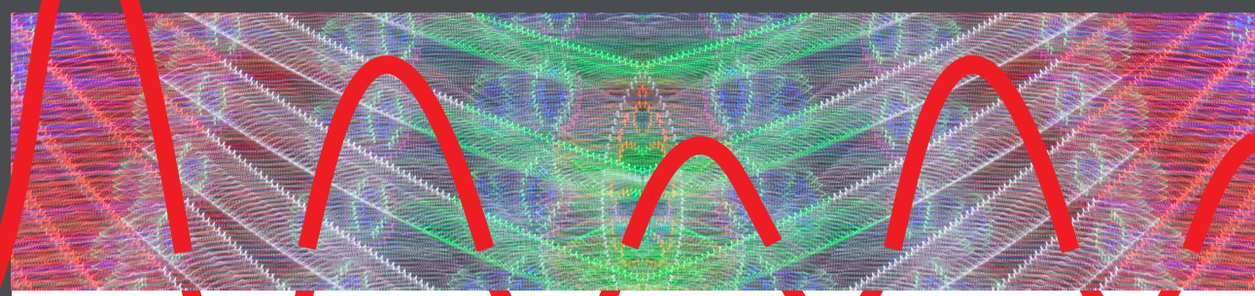

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