Cellular Reference Sheet

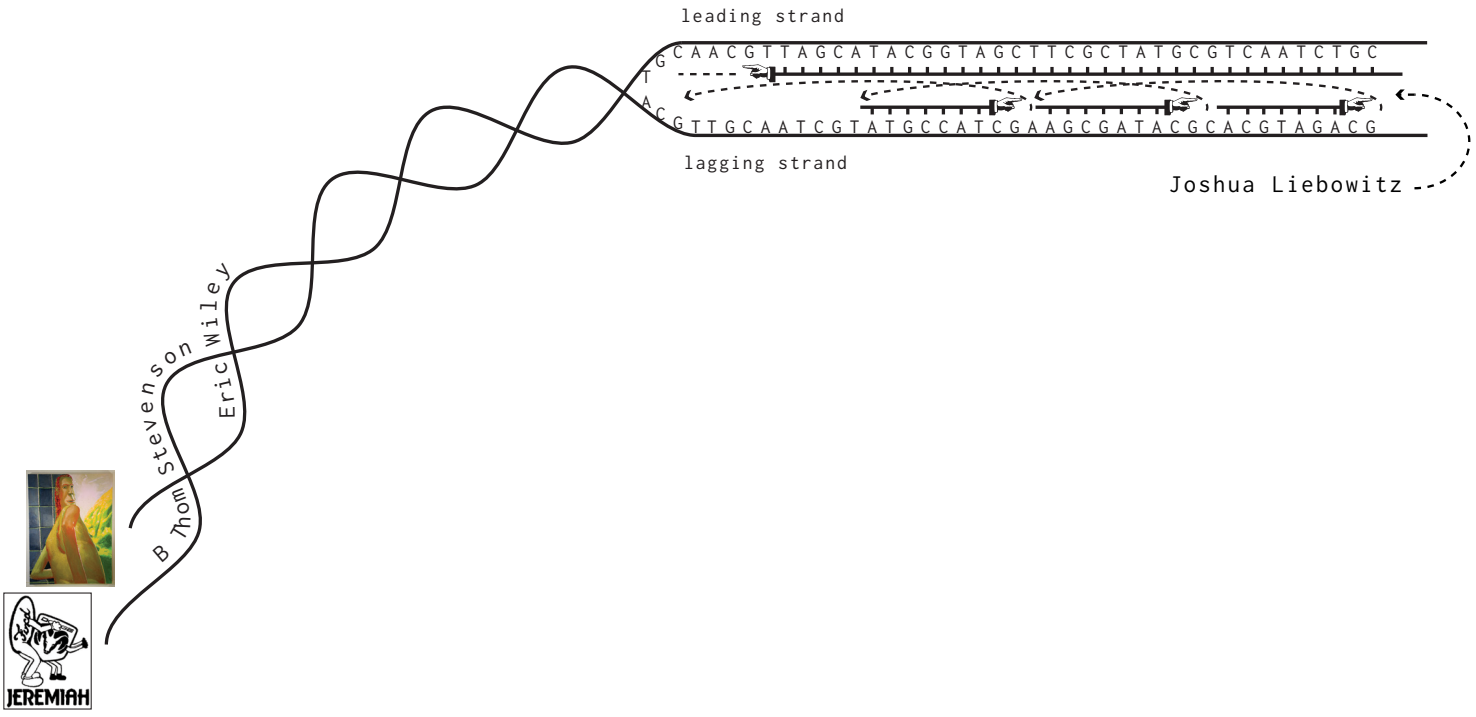
Interphase

Interphase is the period of growth within a cell as it makes a copy of its DNA and prepares to split. The length of this period varies – from decades in human neuron cells, to very short bursts in cancer cells. Interphase begins with a single set of DNA chromosomes, and ends when those chromosomes have been replicated to create a second set.

DNA Replication Process

Enzymes unzip a double-stranded DNA helix to form a replication fork. Then, each separated parental strand is used as a template for the synthesis of a new strand. The two strands are replicated in opposite directions because of their differing orientations after separation. One strand is replicated in a continuous motion by DNA polymerase towards the fork, and the other strand is replicated in short staggered segments by DNA polymerase that extends RNA primers that are distributed along the strand. Together, the segments of this second strand also have a net movement towards the fork, but their individual trajectories move in the opposite direction (as seen in the diagram below). The two DNA helix-es that finally emerge are semi-conservative, meaning each retains one original strand and contains one newly produced strand.

The axis of time in the context of the art fair corresponds to the axis of length of DNA strand in the cell. As days of the art fair progress, so does the DNA polymerase travel over a single DNA strand to fill in the complementary base pairs.



On *Tangle E*

In the manner of DNA replication, *Tangle E* is a five-part series using open-source signal-analysis software to operate on the byte information in 5 pairs of raw image files - as enzymes do on strand templates in a double-helix - to synthesize a new, but inherited information apparatus: in this case, plotted data and video.

The code from each raw file in a pair (one work each from Stevenson and Wiley) was individually imported, then routed into color channels of red, green and blue, corresponding with the original RGB color space of the file. Now a signal, the data was then mapped into a spectrum window - its metadata and bit densities on the x-axis as a function of frequency and magnitude; its pixel dimensions along the y-axis as a function of time. Each video was slowed to 1/128th of its original speed to reflect the approximate duration of DNA replication (here, about 1hr 13 seconds).

Next, one signal of the pair was treated as nucleotide chain in a leading strand of DNA, while the information from the second signal was regarded as a chain of nucleotides in a lagging strand. To excavate and focus in on the spectral energy inherent to each pair of signals, as well as to map the anti-parallel, 3-5-prime directionality of the byte strands, the domains of frequency, magnitude and time in the red channel of the leading signal were inverted and summed to one, while the frequency domains of the green and blue channels were flipped upside down. The lagging signal's red and green channels were flipped similarly, and the bit order in its blue channel was reversed.

Charted as enzyme activities in the space of a cell, then, the data of the leading file (from Wiley's images) moves to the right of its original order, and plays forward in time when displayed in the video window. Conversely, the information of the lagging file (from Stevenson's images) moves right, but also moves in reverse time within the scrolling display buffer. Five split-screen videos offer a record of these polymeric, enzyme-based actions, and a printed information plot containing all five pairs therein is a transcript of the strand-files rejoined.

- *Joshua Liebowitz*

Interphase
SELECT Fair
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