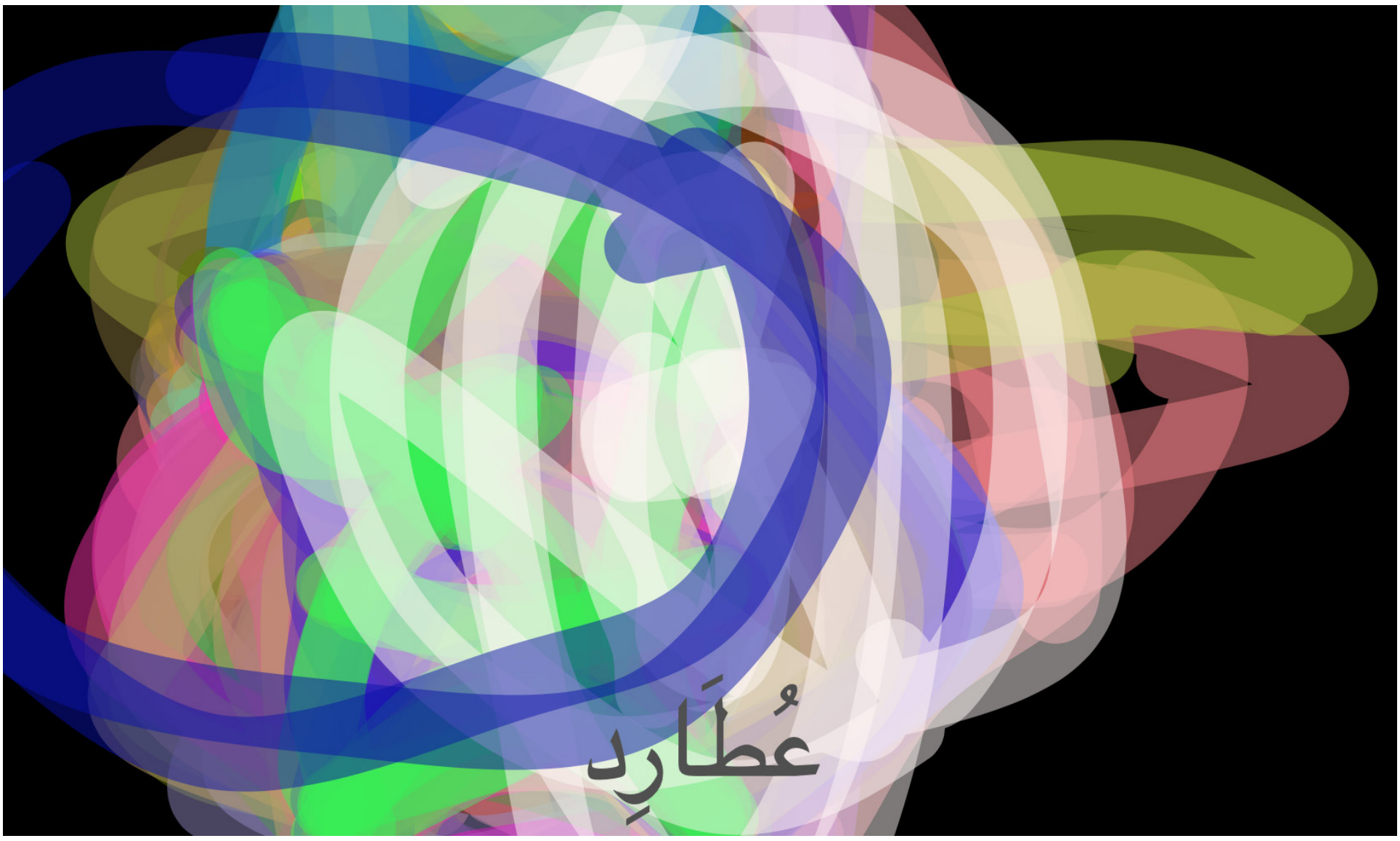
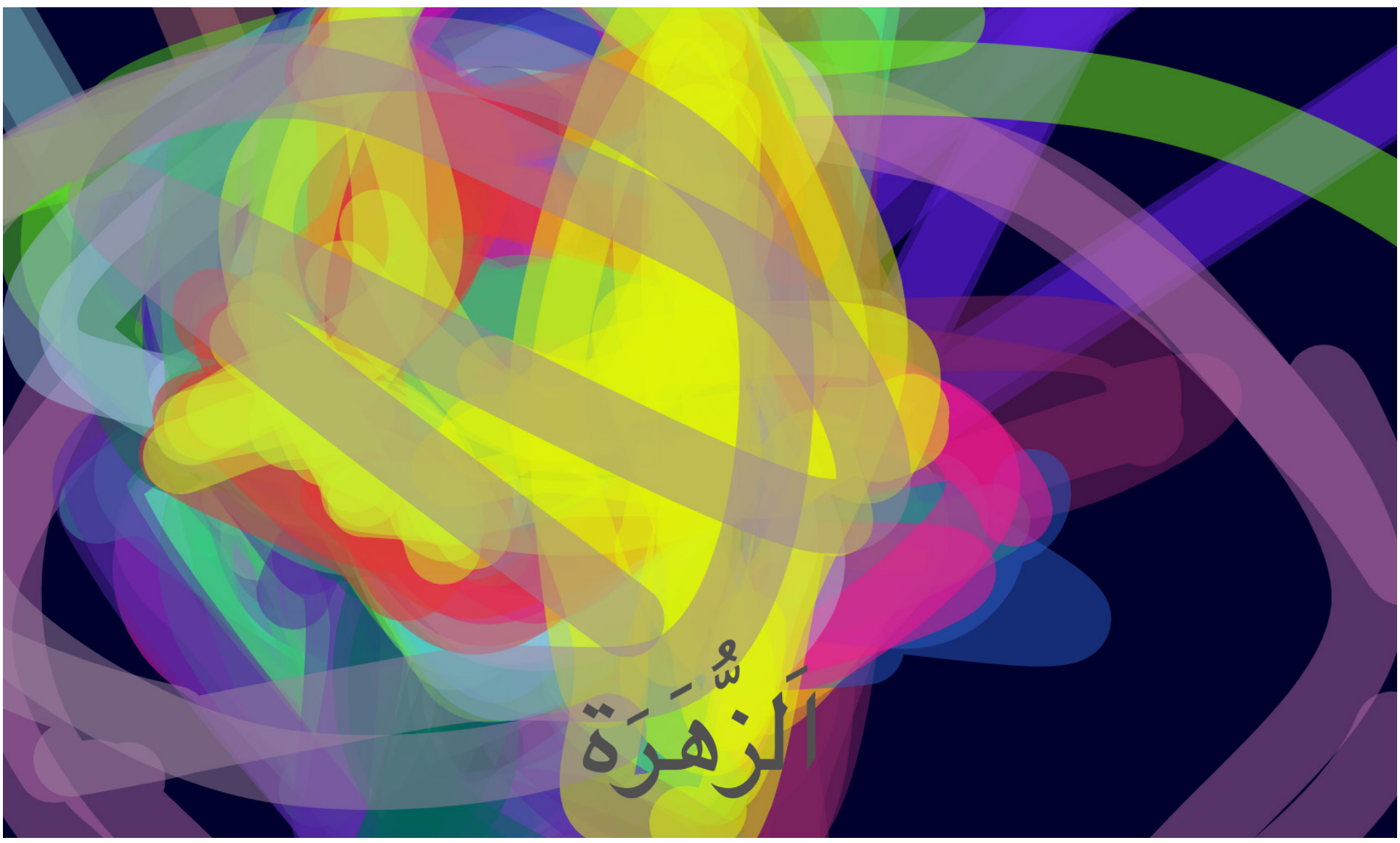


Mercury.



Venus.

Where is Here?

Astrolabes for use on Mercury, Venus, Mars … and even Pluto

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The multi-planet astrolabe sketches were launched in the MIT seminar EC.090 'Recreate Experiments from History' led by Dr. Elizabeth Cavicchi.

An astrolabe (Arabic: ٱلأسطرلاب) is an intricate inclinometer employed by ancient astronomers and navigators to measure the altitude of a celestial body above the horizon. Utilized in the Islamic Golden Age, the European Middle Ages, and the Age of Discovery, it served as a handheld model of the universe, identifying the stars and planets as well as measuring the latitude, determining the local time, and estimating the height of distant objects.

The first universal astrolabe was invented by Islamic scholar Abu Ishaq Ibrahim al-Zarqali (b. 1029). Unlike its predecessors, his 'Tablet of al-Zarqali' projected both the equatorial and ecliptic coordinate systems on a vertical plane that cut the celestial sphere at the solstices, permitting its use at any latitude on Earth.

Inspired by al-Zarqali, I sketched construction lines to create astrolabes for use on each of the other planets, updating his trigonometric calculations with contemporary NASA data. Latitude was standardized at 39.8628° N, matching that of Al-Zarqali's birthplace Toledo, Spain. Variation between the geometric images arises from planetary differences in their obliquity to orbit as well as their orbital and rotational periods. (See Mercury and Venus above!)

My curiosity was sparked by whether the projection effect - the pattern of stars we view from Earth - holds true on the other planets. And, if so, could an astrolabe provide navigational and temporal orientation from there as well? The answer 'Yes' evidences the ability of al-Zarqali's ingenious instrument to cross space and time and guide future explorations of our neighbors.