

Development of microengineered systems to initiate, analyze and control stem cell patterning

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Propositions

Accompanying the dissertation

Development of microengineered systems to initiate, analyze and control stem cell patterning

by

Pinak Samal

Maastricht, 3rd September 2021

- 1) Imaging how stem cells migrate in real time enables the ability to track them and quantify their movement. (This thesis)
- 2) Migration of stem cells is involved in gastruloid (mESC aggregate) elongation and polarization. (This thesis)
- 3) Mimicking embryonic development using pluripotent stem cell based *in vitro* morphogenetic models can advance the understanding of dynamic processes involved in formation of an organism. (This thesis)
- 4) Direct lithography can provide a simple and powerful tool for influencing cell shape, migration and differentiation. (This thesis)
- 5) Microengineering tools like photolithography and microthermoforming, when applied to *in vitro* morphogenesis, promise to provide important insights to advance multiple fields like developmental biology and regenerative medicine. (Impact)
- 6) What I cannot create, I do not understand. (Richard Feynman)
- 7) Simple solutions are usually the best.
- 8) Manufacturing is so hard. I have the utmost respect for those who build things. (Elon Musk)
- 9) Patterning of tissues requires the right cues, either chemical or physical, at the right place at the right time.
- 10) Unlike the use of *in vivo* embryonic studies, stem cell based synthetic embryo models hold immense potential due to better accessibility and by circumventing the ethical issues.
- 11) Development of an embryo is a combination of beautifully and intricately orchestrated mechanisms.